

NATIONAL DISCOVERY MUSEUM INSTITUTE

Phase 3. Report (Final) Master Plan – Demonstration Project

August 2005

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1. Introduction

The National Discovery Museum Institute (NDMI) was established in 2004, with the intent of creating several new learning based institutions along the lines of “living” museums or “discovery” museums. The goal is to build on the cultural capital of Thailand. While the concept of a museum is being pursued, these are not to be just repositories of artifacts, specimens and works of art in the traditional museum sense. Rather, these museums are to be more open-ended places of learning and self-discovery, where artifacts, specimens and works of art are used to enhance the learning process and to reinforce Thai identity and cultural development. The primary audience for the NDMI museums are Thais, and secondly tourists.

The Board of the NDMI decided to do a demonstration project, which applies this progressive approach. The project consists of one museum, at the former Ministry of Commerce site on the southern end of Rattanakosin Island, which is intended to open at the end of 2006. Towards that goal, LORD Cultural Resources Planning and Management, an international museum planning firm, was engaged as a consultant to prepare a Master Plan and Space Plan for this demonstration project. This consultancy started in October 2004. The study has been designed as a three-phase process, of which this is the concluding report and becomes the Master Plan for the National Discovery Museum Institute. It builds on the research, consultation and analysis first two phases of the project. Phase 1 presented and reviewed options for the overall vision and strategy for the Demonstration Project, including the market context and an analysis of the Ministry of Commerce site. The Phase 2 report focused on the preferred concept and the underlying assumptions guiding the planning of the organization, staffing, exhibitions, programmes and space.

This report builds on the previous two reports and operationalises the previous findings and analyses. The phasing of the development of the project is presented, the space plan is clearly defined, including room data sheets, as are the staffing and resources required to carry out the exhibitions and programmes. The Revenue and Cost Projections chapter quantifies the business components of the Master Plan. The last section lays out the schedule and the tasks to achieve the vision as articulated in the Master Plan.

The following chapters comprise the Phase 3 Report:

Chapter 1: Introduction, presents the background of the NDMI, states the vision and mission, describes the concept of the Demonstration Project, and the overall role of the NDMI vis-à-vis museums in Thailand.

Chapter 2: Organization and Staffing, presents the organizational structure of NDMI, and then lists the number and type of staff positions required. It concludes with a section on training.

Chapter 3: Exhibition and Public Programme Concept, discusses the approach regarding the permanent and exhibitions; and second the concept and approach for the public programming.

Chapter 4: Market Strategy, Revenue and Cost Projections, presents a study of the market context, three comparable institutions selected around the world, and concludes with revenue and cost projections for the first five years of operations.

Chapter 5: Space and Facility Programme, presents the approach and options regarding the exhibitions; and second the concept and approach for the public programming.

Chapter 6: Implementation Strategy, identifies the tasks and the schedule for taking the museum through and beyond opening day.

Appendix: Summary of Vision Workshop, November 17, 2004

1.1 Background of the National Discovery Museum Institute

In January 2004 the Government of Thailand created the Office of Knowledge Management and Development (OKMD). The intent of this policy initiative and related projects is to generate and disseminate knowledge with the goal of making citizens more innovative and creative. The objectives for the projects fostering a knowledge-based society will be:

- To provide opportunities in knowledge building;
- To develop creativity and innovation;
- To create learning environments.

A number of initiatives will be undertaken, including several innovative museum projects, which is a sound approach, as modern museums are essentially knowledge based institutions. In his radio address of June 25, 2004 Prime Minister Thaksin Shinawatra made reference to... “the National Discovery Museum, which will provide knowledge and information about Thailand linking to neighboring countries.”

Following the policy announcement earlier this year the government created the National Discovery Museum Institute (NDMI) to lead the museum initiatives. The NDMI has started to articulate a Mission and Objectives to achieve the vision as articulated by the Prime Minister. The attributes of the Mission being discussed include:

- To build and manage the leading national discovery museum institute with a new focus on living and interactive “plearning; (play+learn) through a thematic approach; and,
- To establish a modern, interactive, state of the art museum complex where the public and young people in particular can learn about themselves, their county and the world at large.

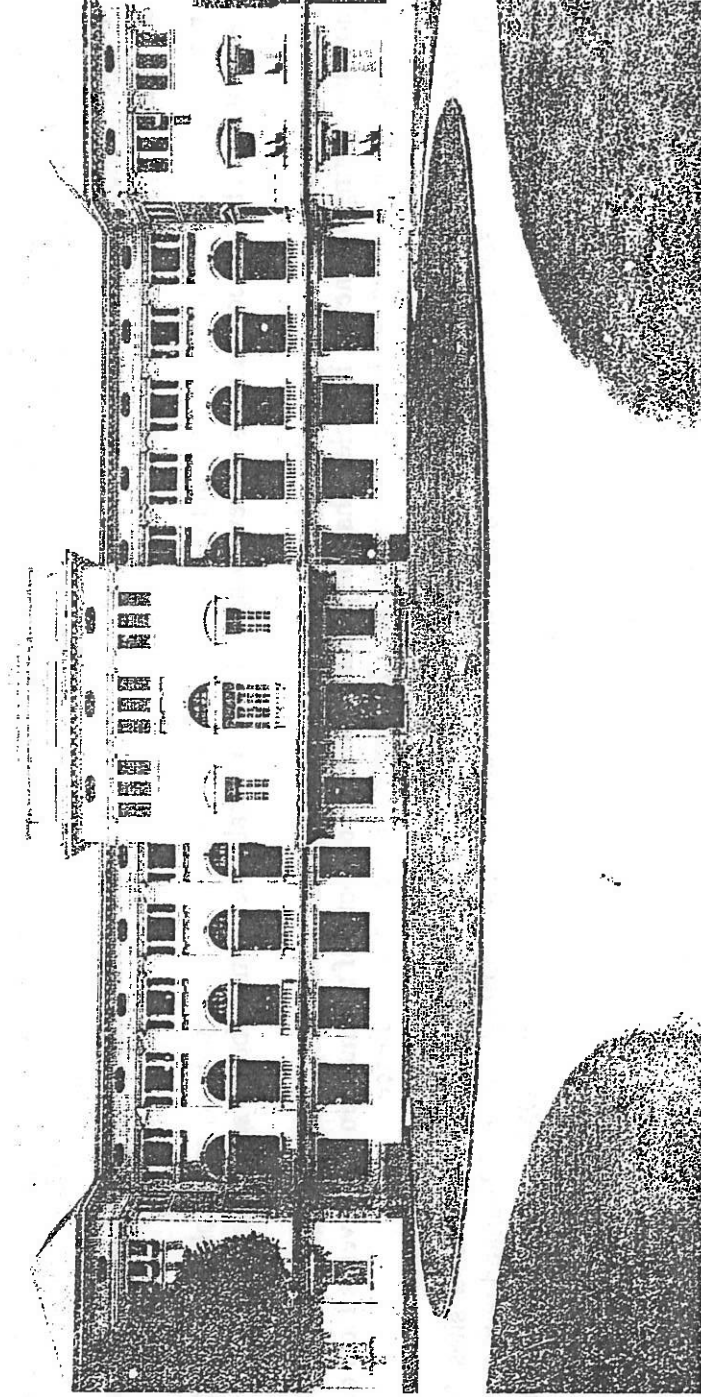
The subject matter to be covered includes Thai and regional art, history, geography, anthropology, archaeology, ethnology, environment, science and technology. The subject matter is still evolving and may be established within four to seven museums.

As specific projects are now starting to be discussed, some general characteristics for the projects and the venues for their implementation are starting to emerge. It is clear that the primary audience or focus of the museum initiatives is local or domestic, that is citizens of Thailand, as opposed to tourists or cultural tourism. The latter is a secondary audience.

Secondly, a number of historic and designated buildings in Rattanakosin have been identified as potential sites for these museum initiatives. Thus the new museums would become part of what is recognized as the spiritual centre of Thailand with the existing temples, royal palaces, museums and other national buildings. However, the new museums created by NDMI are articulating a new vision, which differs from the other existing institutions in Rattanakosin. They strive:

- To provide facilities for education to become a life-long and continuous process of learning;
- To inspire and prepare young people for the rapidly changing technically oriented society;
- To provide a greater variety of cultural facilities that will reflect Thai distinctive social and cultural identity as well as instill self-awareness.

The challenge and the opportunity today are to have an icon of the past take on an image of the future, the old historic buildings presenting the strikingly new. Preserving the heritage buildings, which served as government departments, is commendable as they represent an important part of Thailand's architectural and administrative history. The exhibits and programmes that they house address the future.



Ministry of Commerce Building on the southern end of Rattanakosin Island

1.2 Fundamental Policy Framework

The NDMI has started to articulate a Vision, Mission and Objectives to achieve the vision as articulated by the Prime Minister. An important step in defining these was the Visioning Workshop held in Bangkok on November 17 and reported on in the Appendix. Similarly in the Public Launch at the Ministry of Commerce site on January 19, 2005 Deputy Prime Minister Chaturon Chaisang stated,

“We want the museum to evolve with Thai society. The government is willing to lead its support to ensure all Thais have the opportunity to learn about their history.”

At the same event, Dr. Chai-anan Samudavanija, Chairman NDMI Board of Directors, spoke in even broader terms of reference for the museum,

“The museum will explore all aspects of Thailand, from ethnicity, language, culture, tradition and even horticulture.”

1.2.1 The Vision

The attributes of the Vision being discussed include:

To become the leading learning centre in Thailand using living and interactive “plearning: (play+learn) exhibits and programs to become a state of the art, world class museum complex where the public and young people in particular can learn about themselves, their country and the world at large.

The subject matter to be covered includes Thai and regional art, history, geography, anthropology, archaeology, ethnology, environment, science and technology. The specific subject matter for the initial Demonstration Project is still evolving, but will draw on aspects of all disciplines envisaged as part of the National Discovery Museum concept.

It is clear that the primary audience or focus of the museum initiatives is local or domestic, that is citizens of Thailand, as opposed to tourists or cultural tourism. The latter is a secondary audience.

A number of historic and designated buildings in Rattanakosin have been identified as potential sites for these museum initiatives. Thus the new museums would become part of what is recognized as the spiritual centre of Thailand with the existing temples, royal palaces, museums and other national buildings.

The challenge and the opportunity today are to have an icon of the past take on an image of the future, the old historic buildings presenting the strikingly new. Preserving the heritage buildings, which served as government departments, is commendable as they represent an important part of Thailand's architectural and administrative history.

1.2.2 The Mission

The new museums created by NDMI are articulating a new mission, which differs from the other existing institutions in Rattanakosin. They will strive:

- To provide facilities for education to become a life-long and continuous process of learning;
- To inspire and prepare young people for the rapidly changing technically oriented society;
- To provide a greater variety of cultural facilities that will reflect Thai distinctive social and cultural identity as well as instill self-awareness.

1.2.3 The Objectives

A number of specific objectives have been identified:

- To create new kinds of museums that use modern communication and exhibition technology to create a powerful and attractive learning environment dedicated to understanding Thai society and culture.
- To create new knowledge through research, exhibitions and outreach activities
- To promote the development of museums throughout Thailand as major contributors to a knowledge society through example and sharing of expertise.
- To encourage people to be proud of their Thai identity and to have a better understanding of their own culture and their place in the world.

1.3 Vision for the Demonstration Project

The NDMI's first major museum will be a demonstration project based on the founding principle of discovery learning. It will differ significantly from existing museums in Thailand and future museum projects because it will deal holistically with subject matter, but NOT be dedicated to any specific type of museum like a museum of science or natural history. The Demonstration Project (name to be determined) will be an attraction in its own right and act as a threshold experience for other future museum and learning projects in Thailand. This is the place that not only supports other museums, but also offers a completely non-traditional mode for experiencing subject matter - which will be more comprehensively and traditionally presented in later phases of the NDMI initiative.

What is the relationship between the Demonstration Projects and other Museums?

- **Future Specialized Museums**
 - **Schools**
 - **Regional Museums**
 - **Existing Cultural Institutions**
- Demonstration
Project**

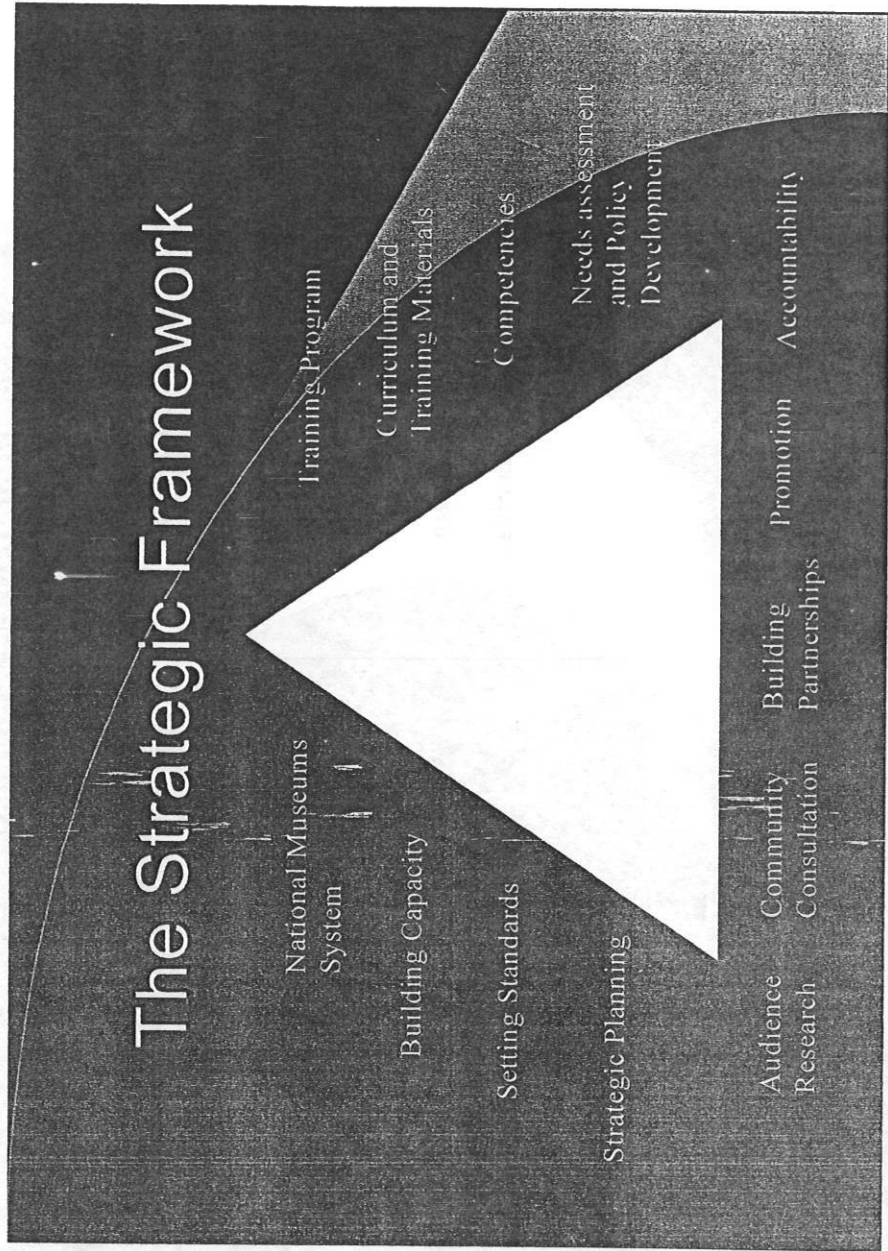
The Demonstration Project is a threshold experience leading visitors to explore Thai culture beyond its physical space. It will become a major support for all existing and future museum projects throughout Thailand. It will:

- Develop temporary and traveling exhibitions for museums throughout Thailand and S.E Asia. It will coordinate the resources and content of all museums and cultural institutions.
- Provide the base of operations for outreach to schools and regional locations (e.g. website, outreach kits, off-site programs).
- Prototype and test new exhibit technologies and techniques as well as content, which can then be incorporated into other museums. The project will serve as a platform to test out ways of communicating and educating, allowing the NDMI to learn from these tests and apply them to the larger specialized museums in the future.
- Be a key resource for all Thais through its state of the art multimedia and resource lab
- Focus primarily on discovery learning, which appeals to learners of all types.
- Build relationships and partnerships between all cultural institutions in Thailand to coordinate initiatives, build on strengths and ensure the success of all.
- Be a dynamic and flexible space – constantly changing to reflect new ideas, exhibits and learning opportunities
- Provide a general introduction to Thailand and Thai culture, which will be more specifically presented in the larger specialized museums to be developed in the future – What does it mean to be Thai? The demonstration project invites visitors to explore that question together.
- Use a multidisciplinary approach to develop content – in other words using a variety of disciplines (e.g. history, archaeology, anthropology, science) to present ideas and subject matter. This allows for multiple perspectives and more inclusive understanding of the complex world we live in. Future museums will be more specialized focusing on one or two disciplines (e.g. Museum of Science).
- Provide opportunities for training staff that will be deployed to other future specialized museums as well as offer courses for the general public, teachers and interns from Bangkok and throughout the country.
- Be relevant to people's lives today, by connecting current issues and culture to those of the past.

1.4 A Strategic Framework for the NDMI

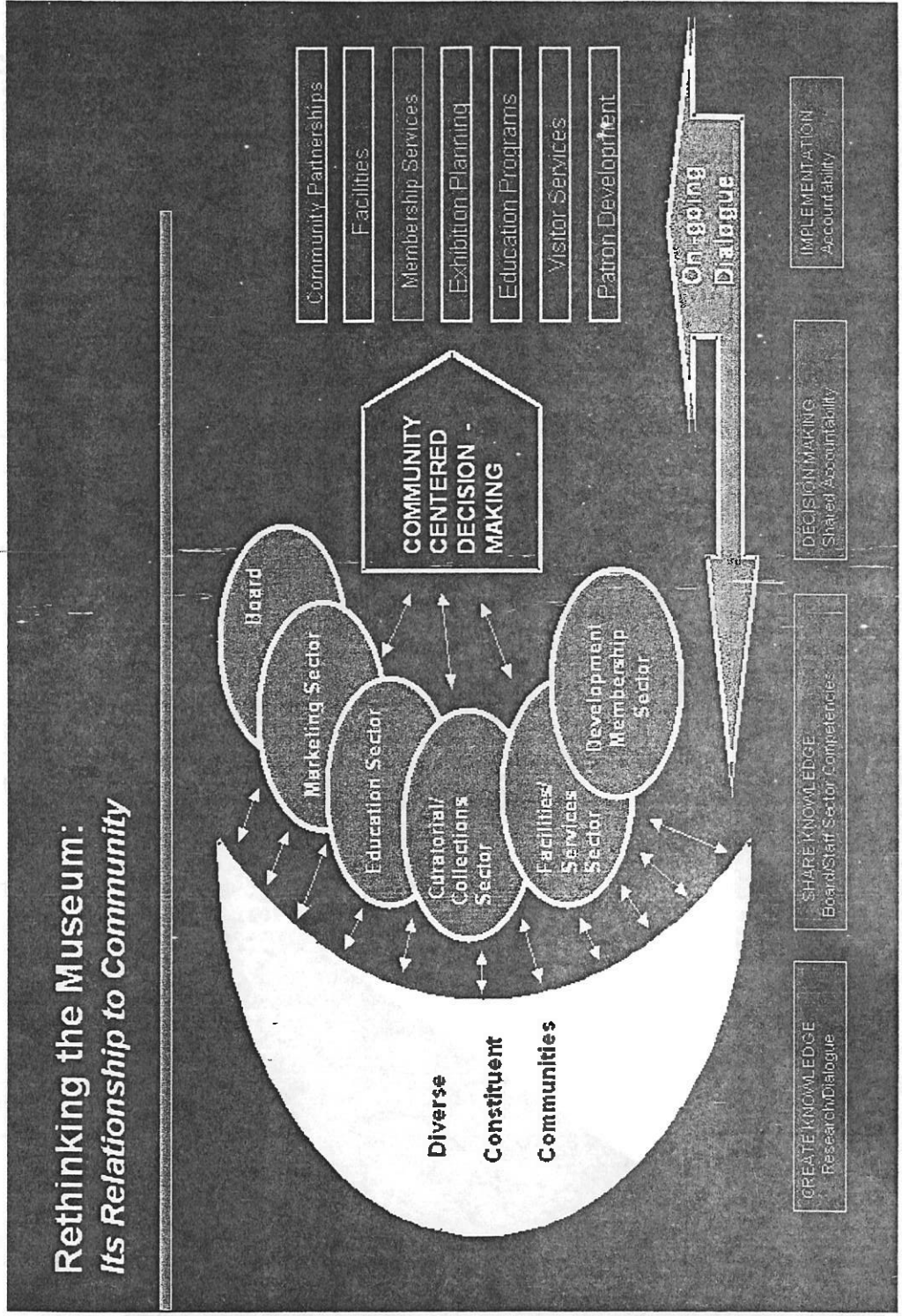
Following from our discussion of the demonstration project, it is clear that a unique opportunity is emerging for the NDMI to play vis-à-vis museums in Thailand. Though the Strategic Plan for the NDMI is beyond the terms of reference of this study on the demonstration project, it is clear to the consultants that the demonstration project is part of a much larger Strategic Framework, within which the emerging Ministry of Commerce project will play an important role. This Strategic Framework can be illustrated as presented below. The framework is based upon Public Awareness and Support (Community), Institutional Development (Museum Standards) and Human Resource Development (Professionalism and Training).

As the base of the triangle illustrates, NDMI is a very modern institution, built upon a foundation of Public Awareness and Support, and engagement. In that sense it can be considered as a "community-centered" institution that engages the community in both its approach to planning, by listening to and encouraging community to participate, and secondly by presenting exhibitions and public programmes back to the community based upon their input. It is also fully accountable to the community, as most of the resources come from the community via the government, sponsorship or through revenue generation. There are a number of ways to build the community support, for the Demonstration Project which are discussed in the subsequent chapters of this study.



1.4.1 Public Awareness and Support - Community Centered Museum

The illustration below presents a structural - functional view of the museum-community relationships and how the dialogue shapes not only the exhibitions and public programmes, but also the fundamental character of the museum. Communities should be thought of in broad terms of professionals, students, young people, farmers, workers, seniors, tourists, and so on, all representing different communities, with different visitor-user needs, expectations and roles.



1.4.2 Institutional Development – A System of Museum Standards

The left side of the triangle indicates the Institutional Development component of the Strategic Framework. This is concerned with the overall development of museums in Thailand to the highest of international museum standards, at the same time reflecting the culture and priorities that are set in Thailand. The NDMI Demonstration Project will set an example of such standards in its development over the next few years. The question facing NDMI as an organization is to whether and how to develop initiatives which advance the Institutional Development of all museums in Thailand, working closely with organizations such as the Thailand Museums Association, the Thailand Committee of the International Council of Museums (ICOM), the Department of Fine Arts, museums, galleries and science centers, universities and other stakeholders.

Standards can apply to such things as collections policy, conservation, research, education, and visitor services, essentially all the activities that a museum might undertake.

Other jurisdictions have undertaken institutional development at the museum systems level, such as in the United Kingdom, the United States, and Canada. In the Canadian situation some very good work also was done by provincial governments and by provincial museum associations. Once the Museum Standards are set, a Museum Accreditation Program can be put in place to help museums achieve a certain level of accreditation. Building Capacity refers to helping institutions develop their capacity to achieve higher standards and a higher level of accreditation. The overall intent is to help museums do what they do better, to be more professional in their activities, and to provide a higher level of service to their communities.

The NDMI may also wish to consider a national policy along the lines of “democratization and decentralization,” the objectives of which are to provide physical and intellectual access to the museum resources in Thailand to all citizens regardless of where they live. This can involve programs of helping establish and nurturing museums outside of Bangkok, traveling exhibitions, the use of all media to disseminate information and for programming. A number of such initiatives are proposed for the Demonstration Project.

Recommendation: The NDMI undertake research to establish a system of Museum Standards and a Museum Accreditation Program for Thailand.



1.4.3 Human Resource Development – Professionalism and Training

The right side of the triangle indicates the Human Resource Development component of the Strategic Framework. Museums are labour intensive organizations requiring a large and complex set of professional skills and abilities, provided by an experienced workforce. In Thailand the museum profession is just emerging, with limited opportunities for in-country training. Consequently most of the current museum staff in Thai museums have received their museum-related training abroad, or have some on-the-job training or mentoring here in Thailand. NDMI as a new organization has the immediate challenge of recruiting experienced personnel to meet its current staff openings as well as those required before the opening of the Demonstration Project at the end of 2005.

In addition, NDMI is working on a new model for museums in Thailand, for which there are few precedents and fewer people who have helped plan and implement a discovery based museum. The option is for NDMI to initiate its own Museum Studies or Museum Training Program, in cooperation with the Thai museum community. Priorities for training and professional development should be for NDMI staff, other museum professionals and the general public. Rather than a university degree level program, these should be a series of short-term professional workshops and seminars of several days' length that can fit into the schedule of working staff.

Human resource development and the increasing professionalism of museum workers, boards and volunteers feeds into the Institutional Development and System of Museum Standards as presented above (1.4.2). Better-qualified and more skilled personnel are a critical standard to be achieved, and can be one of the criteria for meeting certain levels of museum accreditation as proposed. Training is a wise investment in the future and builds human capacity.

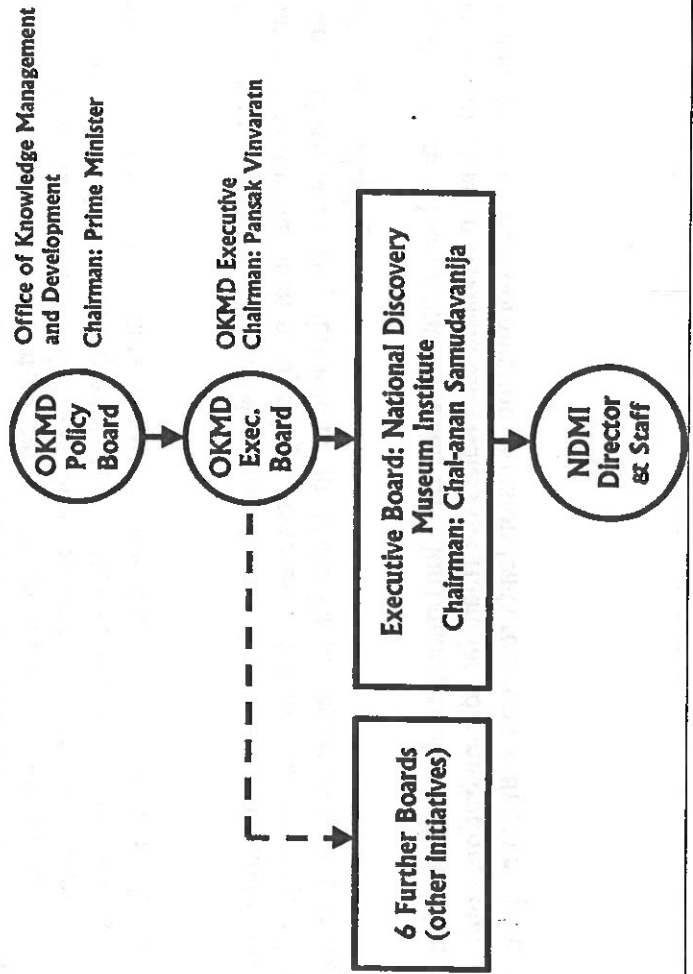
Recommendation: The NDMI establish and implement a plan for Museum Training, firstly for its own staff, secondly for other museum professionals, and thirdly for the general public with interests in museum.



2. Organization and Staffing

The National Discovery Museum Institute is operated under the Office of Knowledge Management and Development, directed by the OKMD Policy Board and chaired by the Prime Minister Dr. Taksin Chinawatra. The NDMI has its own Board of Directors, chaired by Professor Dr. Chai-Anan Samudavanija with the NDMI Executive Director reporting to the NDMI Board. The NDMI is a state funded public organization, with an appointed Board of Directors with full executive authority.

The following diagram outlines the over-all organizational structure of the NDMI:



2.1 NDMI Departmental Structure

The NDMI has multiple functions, which can best be served by a four-department organizational structure. This structure delegates management responsibilities and permits improved coordination of the NDMI's resources, monitoring the museum's activities to ensure that the NDMI's goals are implemented efficiently and effectively. Intra- and inter-departmental teams with specific assignments will be critical to integrating the NDMI's diverse activities and providing a cohesive workforce capable of delivering timely and innovative programming.

Under the Executive Director's office are four departments, which are lead by Chiefs. Each Chief also heads one division within their department. For example, the Chief, Curatorial Division also heads up the Academic Department, which has four divisions (Curatorial, Education, Exhibits and the Resource Center). Similar structures exist within the three other departments (Programmes, Administration and Operations). The four recommended departments are:

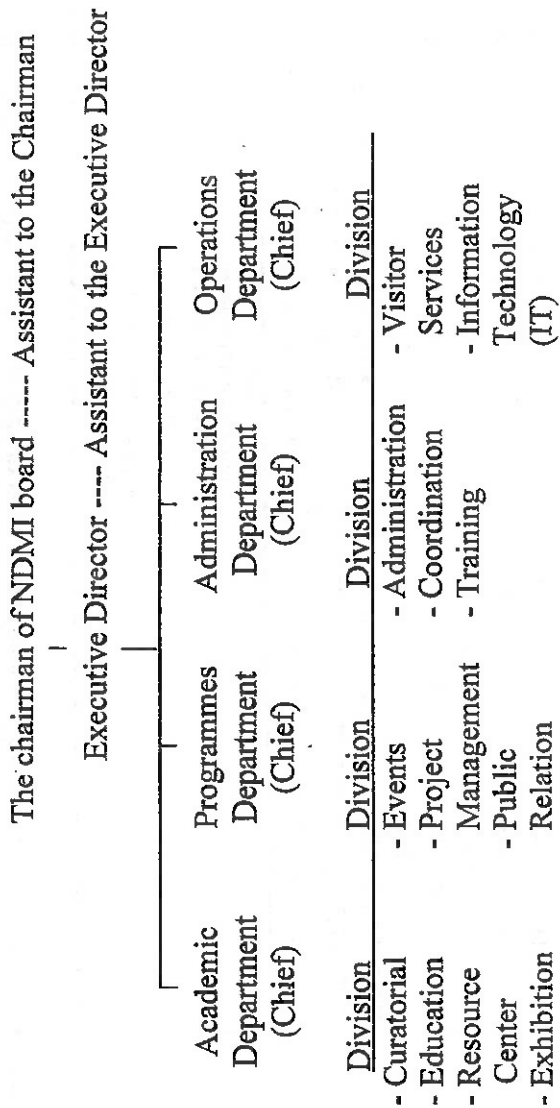
Academic Department (headed by the Chief, Curatorial Division) is primarily content-oriented. It covers the traditional research and collections functions of a museum within the Curatorial Division; the Educations Division links to the formal education system, prepares school kits, curriculum related material, teacher training and education, and in museum education activities for students, adults and other visitors; and other outreach and extension activities; the Exhibits Division designs in-house museum exhibitions, manages in-coming exhibits, and manages the development of NDMI travelling exhibits; the Resource Center functions as a library, with a range of media for individual research, and serves as a forum for lectures, conferences and activities related to the exhibition programme and other events at NDMI.

Programmes Department (headed by the Chief, Events Division) coordinates all events on-site and remote done by NDMI. The Events Division plans, organizes and manages all events such as openings, lectures and festivals; the Project Management Division manages special projects undertaken by the NDMI, such as publications, multi-media programs and outside contracts; the Public Relations Division is responsible for publicity and marketing.

Administration Department (headed by the Chief, Administration Division) manages all administrative, financial and human resource responsibilities within NDMI. The Administration Division undertakes the financial administration, contract management, physical plant and security, audits and contracts management; the Coordination Division leads relations with other agencies in government, universities and international affairs.

Operations Department (headed by the Chief, Visitor Services Division) focuses on services to the public; the Visitor Services Division manages front of house visitor services such as retail and café; the Information Technology Division is responsible for managing all the hardware and software within NDMI, with a particular emphasis on those systems providing public access.

The organization of this level of the NDMI can be represented as per the diagram below:



The Executive Director and the four Department Chiefs comprise the Senior Management Committee of NDMI. Collectively they are responsible for planning, managing, training, delivering, monitoring and evaluating all NDMI activity and reporting such to the Board of Directors. They deliver all the programs emanating from the policies and priorities established by the Board of Directors.

2.2 Staffing

The staffing plan for the NDMI is based on the vision and programmes for the NDMI as a world-class museum. After analyzing many organizational models, the plan described in this chapter was adopted as the requirement for opening year 2006 at the Ministry of Commerce site, and provides for the expansion of the facilities and activities in subsequent years. The positions in the organization are:

<u>NDMI Staff Designation</u>	<u>LORD Staff Designation</u>			
Executive Director of NDMI	Executive Director of NDMI			
Director of Museum	Director of Museum			
Assistant to the chairman	Assistant to the Chairman			
Assistant to executive director of NDMI	Assistant to the Executive Director			
Chief of Academic	<u>Programmes Department</u> 10 positions	<u>Academic Department</u> 16 positions	<u>Administration Department</u> 7 positions	<u>Operations Department</u> 8 positions
Chief of Programmes				
Chief of Administration	<u>Events Division</u>	<u>Curatorial Division</u>	<u>Administration Division</u>	<u>Visitor Services Division</u>
7 positions	Chief	Chief	Chief	Chief
Operation Staff	Event officer	Curator	HR & Finance Officer	Retail Manager
Academic Staff	Event officer	Curator	Internal Auditor	Retail Clerk
IT Staff	Event officer	Researcher	Accountant	Restaurant Officer
Project Staff	Project	Researcher	Contract Manager	Restaurant Officer
Events Staff	<u>Management Division</u>	<u>Education Division</u>	(security & maintenance)	
Training Staff	Project Officer	Education Officer	<u>Coordination Division</u>	<u>IT Division</u>
Public Relation Staff	Project Officer	Education Officer	Coordinator Officer	IT Manager
Coordinator Staff	Project Officer	Education Officer	Coordinator Officer	IT Analyst
Administration Staff	<u>Public Relations Division</u>	Booking Officer	<u>Training Division</u>	Engineer
25 positions	Public Relation Officer	<u>Exhibits Division</u>	Training Officer	
	Officer	Designer	Training Officer	
	Public Relation Officer	Preparators		
	Officer	<u>Resource Centre</u>		
	Marketing Officer	Librarian		
		Researcher		
		Researcher		
Total 32 Positions	Total 45 Positions			

NDMI initially identified a staff requirement of 32 Full Time Equivalent (FTE) positions. The LORD Master Plan identifies 45 positions, as listed above. The majority of this staff can be located at the NDMI administrative office, which is off-site. When the Commerce site is fully operational in late 2006 the front of house staff in Visitor Services, IT, Education, Resource Center, and Events will relocate to the site to provide direct services to the visitors. Offices and back of house space is identified for this staff in Chapter 5. Space and Facility Programme.

Most of the staff identified above should be hired and in place by the end of 2005 or early in 2006 to allow sufficient time for planning for the opening. Having said that, those in the Academic Department should be hired as soon as possible, that is early in 2005 as they have an important role in the detailed planning of the exhibitions and programmes, the setting up of the Resource Center, and the planning of the temporary exhibits. Consequently the services of the Administration are also required early in 2005 to support this activity.

The above staffing numbers do not include positions for maintenance, cleaning and security, which are contracted services. These will be required primarily after the site is open to the public, but should be phased in sufficiently in advance of the opening. Some cleaning and maintenance will be required in the off-site offices, which is already in operation.

Prior to opening, the NDMI, in Phase 1 up to 45 additional staff may be required for site related duties related to education, resource center, events and visitor services. This could increase by an additional 5 positions to staff the Phase 2 opening.

2.3 Staff Training

A staff training programme instructs employees in how to do their job, whereas employee development programme open up new opportunities for staff. Both may be organised in-house and may be provided by sponsorship (partially or fully) of employee participation in courses offered by other institutions or organizations. These may be museum training programmes from the introductory to the postgraduate level, or course in a wide variety of professional pursuits, technical or management skills that may be useful to museum staff members in all posts.

The successful museum will provide a constant learning environment for its staff as well as visitors. An important requirement of professional museum management is therefore to provide a training and development strategy that establishes general policies of support and is related to specific needs of each individual, from the director to the maintenance staff. The strategy up dated annually, should identify the training need of museum, including provision for planned changes in direction, as well as the personnel development plans of

each individual, agreed in a consultative (and confidential) process of mutual identification of need and resources. It is important for the director or training officer whoever is representing the museum to ensure that the personnel development plan meets the institution's requirements, rather than merely serving the career goals or enthusiasms of the individual employees.

A staff-training program is reflected in the NDMI budget (Chapter 4) to serve as an incentive during recruitment, as well as to allow for continuing opportunities for professional development. This includes opportunities for training and upgrading of academic credentials, participation in workshops, seminars and conferences, study-tours, apprenticeships and professional research.

In addition, in the Introduction Chapter (Section 1.4.3, page 12) a major training opportunity was identified for NDMI at a national level, which would apply to staff as well as others interested in museums. This is not included in the Chapter 4 budget, as it would require additional research to project, based on a specific program design and anticipated market demand.

3. Exhibition and Public Program Concept

3.1 Programs

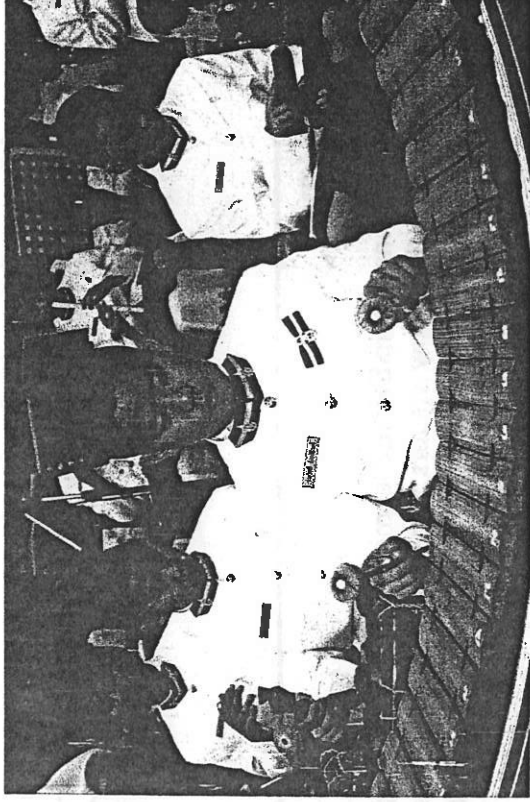
Each visitor brings an individual learning style to the museum experience. Thus it is important for the new Museum to present a variety of experiences that allow visitors to select the programs and exhibits that are best suited to their own learning style. There are seven styles of learning or “types of learners” that will be addressed by the demonstration project (note that the exhibition framework is presented in section 3.2).

- Visual Learner – learns best by visualizing, dreaming, working with and creating pictures, moving images, and colors.
- Linguistic Learner – learns best by reading, writing, telling and hearing stories.
- Logical/Mathematical Learner – learns best by classifying, working with patterns, abstract problem solving, experimenting and asking questions.
- Musical Learner – learns through singing, dancing and listening to music, working with rhythm, patterns and memories stimulated by audio experiences.
- Kinetic Learner – learns best by touching and feeling, processing knowledge through action.
- Social Learner – learns best by talking, sharing, cooperating, interviewing and comparing.
- Solitary Learner – learns best when working through individual projects, reflecting and pursuing his or her own interests.

3.1.1 Education Programs for Schools

A primary audience for the Museum will be school groups. It is generally found that the bulk of the school market activity available to any museum is from the local area. This is especially true for museums in Thailand in which school groups accounted for 38% of current Thai museum attendance.

A long-term goal is to work collaboratively with local school districts, curriculum planners, principals, and teachers to develop a unique relationship to enrich education in the schools through curriculum-based programs in order to encourage school attendance at the Museum. School programs should provide additional support for what educators are teaching in the classroom about science, natural history, and culture. The demonstration project will wish to position itself in terms of its unique breadth of programs that are not available at other destinations. Pre-registration should be encouraged in order to allow for effective budgeting of materials, and customization of content.



- **Tours—Teacher- or staff-guided tours** will be specifically created to meet particular curriculum requirements of each grade level. Teachers will pick from a menu of tours of varying length (1-hour or 1/2 day). Offerings may also include themed classroom experiences that correspond to current exhibitions. These classes will include a variety of hands-on activities for students. Staff and/or staff leading the tours must be trained to deliver the subject matter as well as in techniques for touring children of different ages. Tours guided by teachers will be informed by the Teacher Resource Manual and/or Teacher Training Program offered by the NDMI.
- **Pre- and Post-Visit Activities.**— Teachers will be provided with a complete “visitation” package that includes activities, projects and information that teachers can use in the classroom before and after a visit to the site. This will enrich the students’ learning experience as well as be more attractive to teachers. Teachers will be more likely to organize a trip to the NDMI’s demonstration project if they are provided with a full program of educational activities that extend beyond the visit to the site and materials that enumerate the curriculum requirements fulfilled by a visit. This is also an excellent opportunity to obtain feedback to improve existing programs and develop new ones.

- **Teacher Training Program** - Creating awareness of educational opportunities at the site among teachers will have a significant impact on the demonstration project and area schoolteachers. The Research Centre will be an important tool for training teachers and other adults. These programs should include:
- **Orientation to Exhibitions.** Teachers will register for a one-day or ½ day training session where they would learn more about the exhibits, programs and discovery learning offered by the demonstration project. Teaching materials will be provided to assist the teacher in the classroom and prepare their students for a field trip.
 - **Museum Open House.** The Museum will invite teachers and volunteers (also parents and members of the community) to visit the Museum's exhibitions and become familiar with educational programs and facilities. Teacher memberships, training aides, sample lesson plans, and other educational opportunities and materials can be made available.
 - **Teacher Training:** The Museum will work with Thai teachers' training programs, such as in-service, certification, or degree-granting programs. For example, teachers-in-training may develop a tour and study session for which they would receive credit and practice teaching in their program of study. These types of programs will be excellent opportunities to work with adult and professional schools in the area as well as degree granting universities.
 - **Teacher Resource Manuals** - These are complete guides and teaching tools that educators can use in the classroom whether they make a trip out to the site or not. These may include access to slide kits, photos, information sheets, study options, educational activities and so forth—all within the context of the themes explored at the NDMI. These manuals will likely encourage visits to the site as class trips or by students doing school projects or who ask their parents to take them as a result of an in-class "experience." These manuals combined with teacher training opportunities will develop a partnership between the NDMI and education departments as well as fulfill the mission of the NDMI.
- **Junior Docents** - training youth (from age 13 through to 16) to give tours and lead activities. This encourages confidence, development and life-long learning.
- **Junior Curator Program** - Individual youth or entire classes will have the opportunity to organize and present exhibitions - especially about what it means to be Thai or on topics of Thai culture directly related to the themes of the permanent and temporary exhibitions. Even though the museum will not be a collecting institution, the program could use community-based resources or collections from the Thailand's network of museums partners. These are longer-term programs that allow educators to enhance classroom offerings. At the end of the program, parents, guardians and friends can be invited to the exhibition's opening.

Promoting and marketing school programs will be essential to making teachers and school administrators aware of the options, learning opportunities, policies and procedures for a school group visit. For example, each year the program brochure should be made available to all teachers by the end of the current school year for the following school year, and the museum should begin to take program bookings one month before school starts. The brochure should clearly indicate the program menu and identify exhibition themes and how each program relates to the core curricula, meets national standards, and promotes cross-disciplinary education. In order to reduce print costs, these materials can be made available online with special pages for teachers (e.g. a newsletter).



3.1.2 General Programming

Non-school-related programs fall into two categories: registered and unregistered:

- Registered programs are reserved in advance by visitors and may include a fee. These programs encourage repeat visitation, membership, and generate revenue.
- Unregistered programs are free and part of the on-going schedule of programs offered by Museum staff.

A balanced offering of these types of programs ensures the liveliness of the site for both casual and repeat visitors.

3.1.2.1 Unregistered Programs

- **Guided Tours** – The museum will offer a regular schedule of general tours. These tours may take place only on weekends and/or on select days of the week during peak visitation periods (e.g. tourist season). These tours should take place when there are a large number of visitors on-site who may want to take the tours. These one-hour tours are free and can be themes to appeal to Bangkok residents, tourists from other parts of Thailand, and foreign tourists. They can be additional targets for families or seniors.
- **Storytelling/Demonstrations/Music** – The museum can organize weekly or bi-weekly demonstrations, music/dance events, or storytelling hours that could take place in the exhibition galleries or the specialized classroom spaces. This is a great way to invite people in the community to come to the Museum on Saturday mornings to share their memories or stories or for specialists from universities or other institutions come and demonstrate scientific phenomenon. Artists, musicians, chefs, and craftspeople should be regularly invited to create a diverse offering of special events.
- **Targeted “Audience Days”**: Seniors, Families, Youth – Creating days and/or nights that specifically invite a particular audience is a great way to bring visitors to the site. Family, Youth and Senior Days should include a series of special programs along with discounted entrance fees (if applicable) and products in the Museum shop and cafe. These days should be organized on a regular basis – monthly – to ensure repeat visitation. Youth days should focus on providing opportunities for socialization, training and access to the Internet (e.g. use of the multimedia lab as an “internet café”).
- **Festivals and Holidays** – The staff should coordinate the site’s programming with many of the great festivals and holidays that take place throughout the year in Bangkok and Thailand. Key holidays for which programming will be developed, but not be limited to, include:

- Thai New Year's Celebration – also call *Songkran*, occurs in April and is an opportunity to look back and to the future.
 - Thai Children's Day – Thai children are highly regarded and the second Saturday of January is dedicated to celebrating children.
 - Teachers' Day – This is an excellent opportunity to encourage training and programming for teachers. This is a day for pupils to honour their teachers.
 - Chinese New Year – More than 6 million people in Thailand have Chinese roots, therefore this is an important public holiday for which the NDMI should provide programming.
 - Chakri Day – The celebration could coincide with programs dedicated to historical presentations of the founding of Thailand and Thai culture.
 - Royal Ploughing – week long programs leading up to the holiday can focus on agriculture, evolution, technology, and ceremony.
 - General Public Holidays are an opportunity to attract youth and families for special programming. These holidays include: Visakabucha, Asahabucha, Coronation Day, National Labour Day, Buddhist Lent Day, the King and Queen's Birthday, and more.
- **Oral History Program** – There is a rapidly growing interest in oral history and preserving oral traditions. History is being lost each day. The NDMI's Demonstration Project can spearhead a major program to collect and preserve oral histories which can then be disseminated through its outreach program and used in its permanent exhibitions.

3.1.2.2 Registered Programs

- **Specialized Tours** – The Demonstration Project of NDMI can develop specialized tours for groups who book them in advance. Senior's, social clubs and tourist groups often book tours that are developed to meet their special needs and requirements. Like the school tours these could be ½ day or full-day events. Tour operators are looking for sites that offer customized experiences for their clientele.

- **Seasonal Camps/Afterschool/Weekend Clubs** – Children can enroll in programs offered during school breaks or on weekends to further their exploration of Thai culture, science and technology. These specialized programs will be hands-on and draw on the resources of the demonstration projects and eventually the future specialized museums. The seasonal camps could include field trips to places around Thailand, offering new opportunities for young people to experience their country in new ways. Full day camps, while resource intensive, are well received by most communities. Collaborating with partners and the government could alleviate costs and maximize human resources. Weekend and after school programs could be set up as registered or “drop-in” clubs for school children and youth where staff offer a variety of hands-on activities or studio type classes related to art, music, dance, storytelling, cooking and more. Access to the Resource Centre will be an excellent draw for youth wanting to surf the internet or explore the cultural CDs and DVDs.
- **Leadership** – A way encouraging youth is to help them develop leadership skills. Youth can become special volunteers to assist with tours and other programming provided by paid staff. This builds confidence and self-worth in young people as well as encourages lifelong learning. A way of encouraging this type of involvement is to partner with schools for internships and extra credit opportunities.

3.1.3 Outreach

- The Demonstration Project and its staff will be responsible for organizing and distributing outreach programs throughout Thailand – marshalling the resources and content of all the future specialized museums as well as those of partner institutions. Outreach provides an excellent opportunity to reach out to Thailand’s **lingual minorities** by developing the website, traveling exhibits, and travel kits in multiple languages. These efforts should include a lot of audio to reach out to audiences who cannot read or write.
- **Website** - One of the key methods for reaching out to visitors around the world will be the NDMI website. It is recommended that the NDMI will have one main internet location that coordinates and presents all the museums (demonstration project, future specialized museums) within a consistent framework and delivery system. This will allow the NDMI to focus staff resources and ensure that that the resources of all museums and partners are used to create an informative and interactive web experience. The website will also be an important marketing tool for the NDMI.

- **Travel Kits** – Staff can distribute small “trunks” or “heritage in a box” filled with activities, replicas and educational materials to send to regional museums, schools and other social organizers around Thailand. These could be patterned after the discovery boxes described in section 4.3, allowing people – especially children – from around Thailand experience the discovery learning to be found in Bangkok. These kits can be rented or loaned out to schools, regional museums, and community centres. The later is very important as there are a large number of children and youth who are *not* enrolled in school. This type of “urban outreach” is currently being planned in Kluipatong, South Africa as a “eco-museum” model – essentially a museum without walls in which the community plays a large role in the development and distribution of content.
- **Traveling Exhibitions** – Like the traveling educational kits, the museum will organize temporary exhibits that will travel around Thailand and possibly Southeast Asia. These exhibits may include collections from the future specialized museums and cover a wide range of topics. Again these exhibits should travel to non-traditional museum spaces to provide access to children not enrolled in school or adult audiences who will not go to a museum (e.g. the mall, a market).
- **Visiting Artist/Docent Program** – Sponsored by the museum (and its partners), this program could stand on its own or complement existing public programs. Artists and docents will visit the classrooms to present a slide show of an exhibition; introduce visitors to other aspects of culture, history, and natural history; conduct a music or art lesson; or lead storytelling. This is an excellent way to reach out to schools who may not have the resources to visit the museum, but may encourage students to do so on their own time with their parents and guardians.
- **Bus Service** - Other institutions are attempting to reach out to diverse and other underserved or not traditionally museum-going communities by providing or subsidizing a bus service. Often in collaboration with other attractions, the service will pick up families, children, and adults at appointed corners in these communities and bring them to the Museum. This program could be expanded to include marginalized and ethnographic communities in outlying regions. For example, the *Hall of Opium* successfully buses youth to the museums (thanks to donations by sponsors like Honda) – especially youth from tribal communities.
- **Training/New Museum Initiatives**– One of the key goals of the NDMI is to reach outside its own walls to provide essential support and network Thailand’s museums, historic sites and educational institutions. This network will be supported by training (on-site and off-site) in museum education, conservation, and preservation as well as encourage information and resource (e.g. collections, staff) sharing. The NDMI plans to offer a comprehensive program of training and technical support.

➤ **Research** – Research opportunities at the Demonstration Project will be focused on museology and training for teachers and new museum professionals. Research projects will be closely linked to the Incubator (temporary exhibits, prototyping) and the Resource Center which will be a state-of-the-art computer lab suitable for training. Research will lay the groundwork for future programs and the Demonstration Project and the future specialized museum, however, research programs related to specific academia should be conducted at the specialized museums of science, art and history. The Demonstration Project will lead research in visitor evaluation and testing (qualitative & quantitative) to evaluate programs and visitor profiles. This information will be invaluable to increasing attendance to museums throughout Thailand – by understanding the visitor profile and needs – and ensuring that new exhibits and programs meet the needs of visitors.

The demonstration project will support future museum initiatives by the NDMI in which more specialized and larger museums will be conceived. These museums will provide a more comprehensive and in-depth presentation of culture, science and art as opposed to the demonstration project which focuses on discovery learning. As a base of support, the demonstration project will organize and coordinate training, the website, temporary exhibits, outreach and more.

3.1.4 Collections

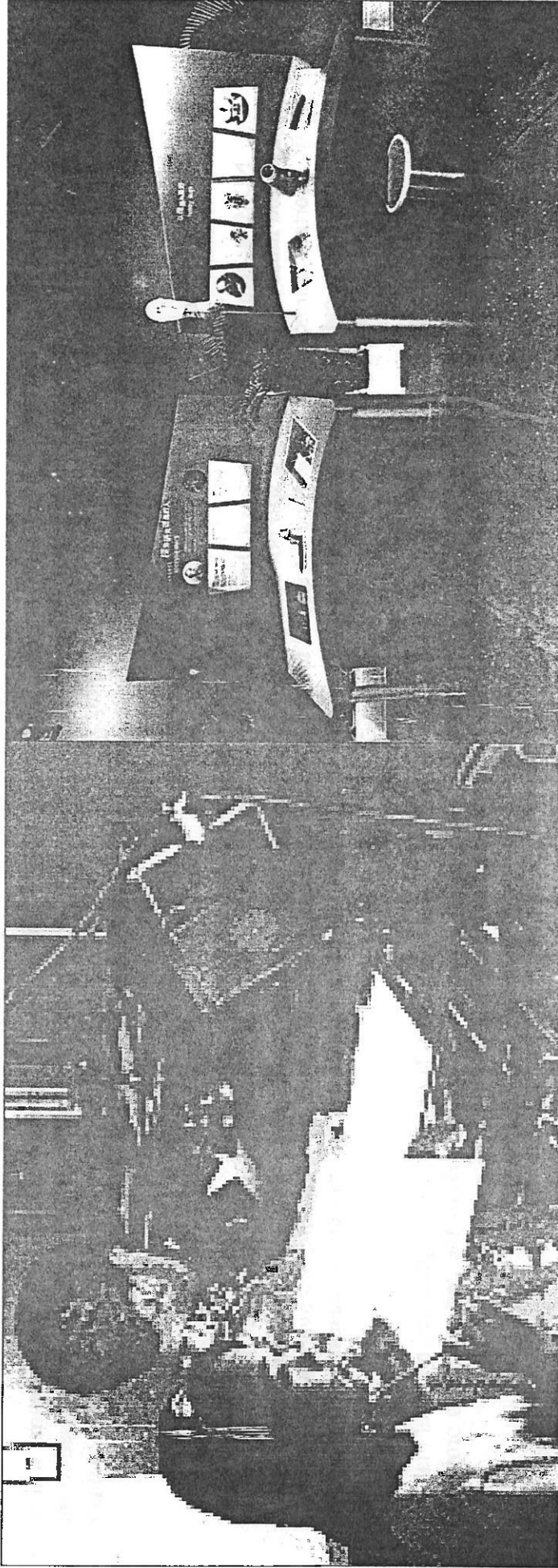
The NDMI's demonstration project will be primarily focused on interactive experiences and discovery learning. Unlike the future specialized museums, this museum will not be a major collecting institution. Collections will be for educational and hands-on purposes only. In other words, collections will be developed to further discovery learning and be used in traveling kits, discovery boxes, and sent to schools. These collections do not require the rigorous conservation and storage standards of other museums because visitors will be allowed to touch and study them.

The museum will also have limited storage and preparation facilities to provide short term storage for 3-D objects and archival material borrowed for its permanent and temporary exhibition program. These facilities will be important to allow the demonstration project to borrow objects from private collectors and Thailand's network of museums and historic sites.

3.2 Exhibition Interpretive Strategy

The visitor experience at the NDMI will be non-linear and based on discovery learning. A majority of the exhibits will be hands-on and media based appealing to learners of all types.

Being non-linear means that the visitor will be free to choose their own route through the exhibition galleries and within the exhibition areas. Therefore, each visitor experience will be unique and driven by their own curiosity.



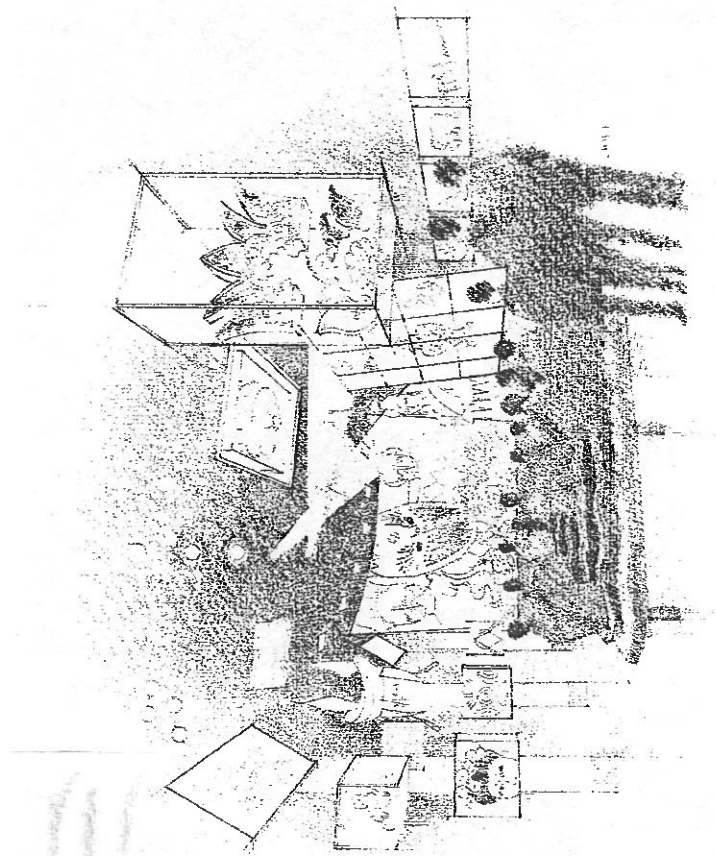
Wow Experience: Object Theatre

When visitors arrive at the museum they will be treated to a multisensory and exciting “object theatre” experience. Unlike traditional theatres where visitors watch a film projected on a screen, the object theatre incorporates sound, special FX, real artifacts, smell, performance, and stage props. The element of surprise and appeal to the senses, are key tools for exploring cultural topics such as “what does it mean to be Thai?” Special FX, the sudden lighting of objects and other surprising events will engage the exploration of topics and different perspectives possibly presented by Thai or Southeast Asian personalities, athletes, or entertainers. Visitors can agree or disagree and debate with friends and family as they leave the theatre and explore the rest of the museum.

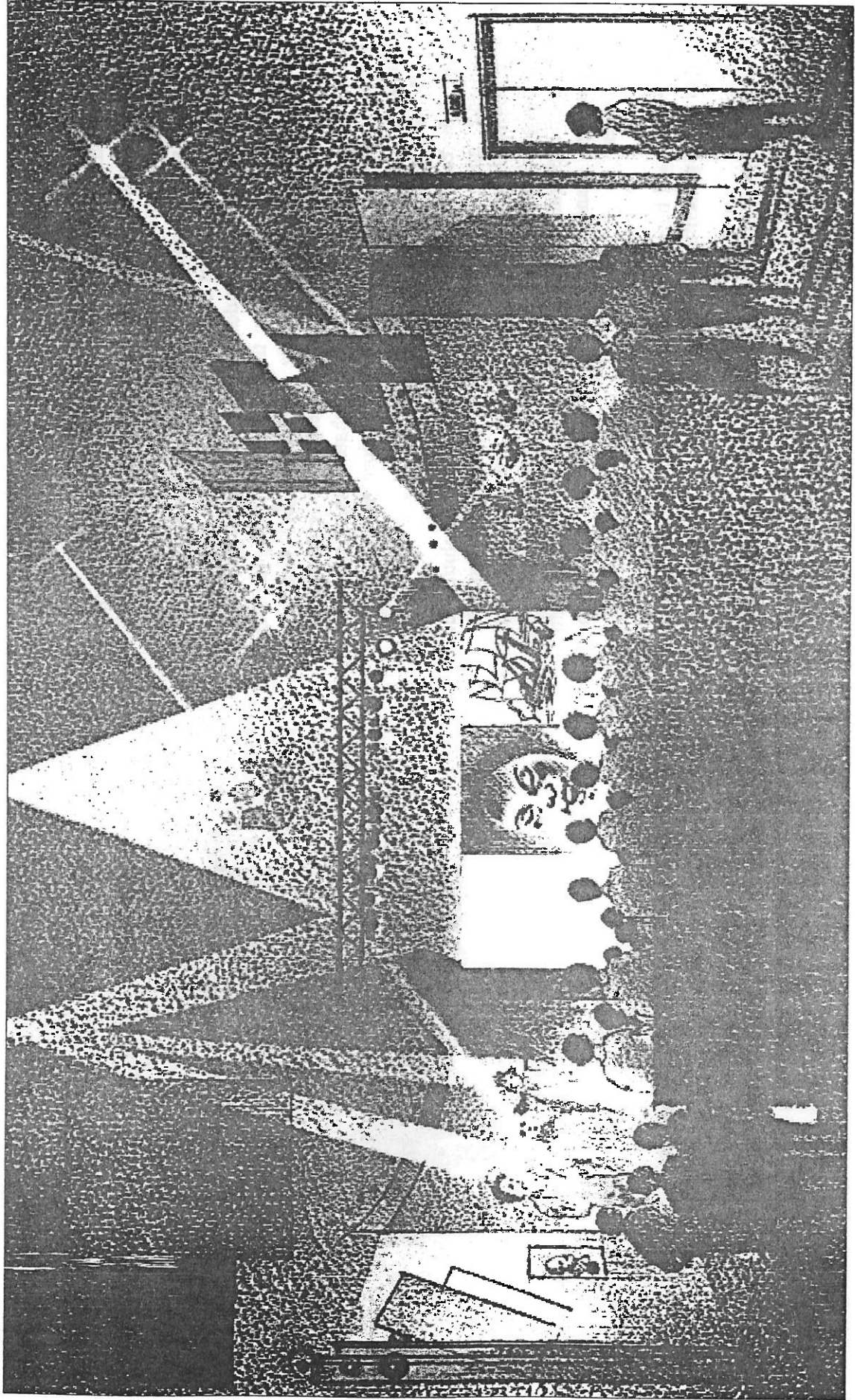
The show can begin with the formation and evolution of Thailand and then move into regional and cultural explorations. In other words, move from geology and geography to culture. The show should end with a question or points of exploration. The point is for visitors to go out into the museum – and the world—and discover the answers for themselves.

The theatre will be sized to accommodate a typical classroom of students or 40 to 50 adults. As it will offer an intense experience, the length of the presentation will be from 10 to 12 minutes which will allow for up to 4 showings per hour.

Primary learning styles engaged: Visual, Linguistic, Musical and Social.



Object Theatre



Open Your Mind to Discovery

What is a Discovery Museum? What is Discovery Learning? How can I participate? These are just some of the questions that the orientation area will answer and explore with visitors. We want to prepare visitors to for this highly unique experience and way of learning. Minds-on, hands-on, multimedia and other immersive exhibits put visitors in control of the learning process! The nature of the experience requires active participation with the content located throughout the museum. Logic games, activities of choice, comparison and contrast, an orientation video, and an exhibition on “what kind of a learner are you?” will help visitor’s prepare for their “discovery experience.” A changing exhibition called “Did You Know” will also help visitors engage in discovery learning, by surprising them with facts and figures about Thai regions and culture.

Primary learning styles engaged: All learning styles will be engaged.

The Incubator

This is an area in the museum where exhibits, learning styles, and content are tested and constantly changed. Temporary exhibits on various topics will encourage repeat visitation and draw upon collections/content from the larger specialized museums (future), and potentially from Thailand’s network of existing National Museums and private collections. These exhibits may eventually travel to regional outposts of the NDMI and to other countries in Southeast Asia. The incubator is a place to prototype new exhibits and ideas that may eventually find a permanent home in the larger specialized museums. NDMI staff can evaluate the effective use of content and exhibit media. Feedback systems will invite visitors to comment on their experience as well as submit their ideas for new exhibits and programs. The incubator will include program and demonstration areas for registered and unregistered programs, lectures, and storytelling. It will be an important tool for outreach.

Potential temporary/traveling exhibitions:

- Evolution of Watercraft Technology
- Thailand in Southeast Asia
- The River
- Thai Cuisine
- Traditional Thai Orchestra
- Thai Language Families

- Tsunami – Waves of Disaster
- Technology and Thai Society
- Sports and entertainment

Primary learning styles engaged: All leaning styles will be engaged.

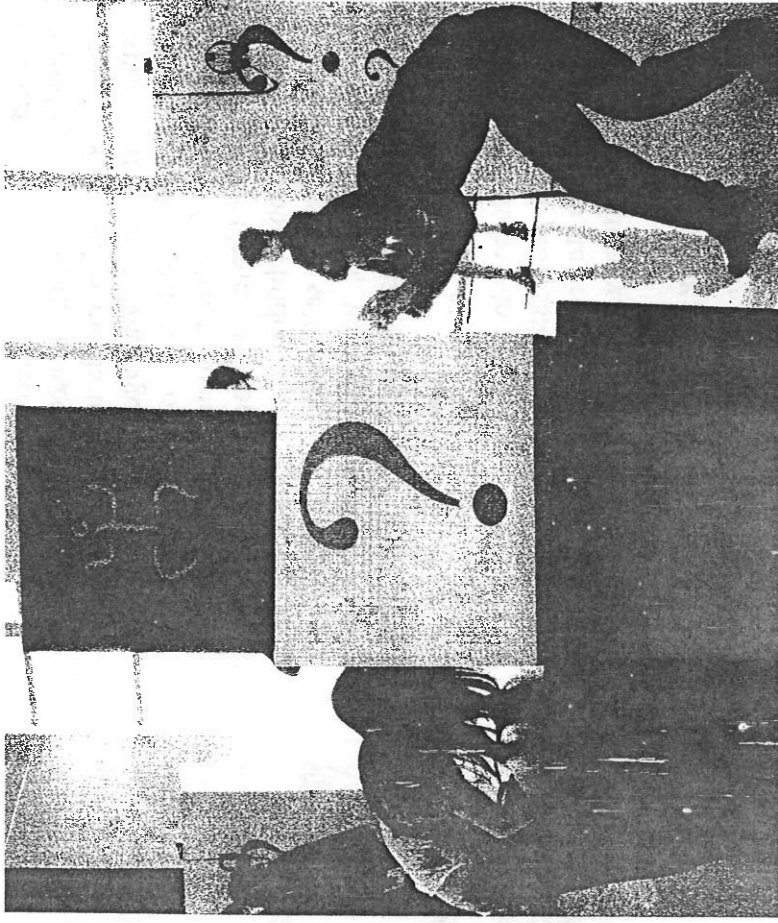
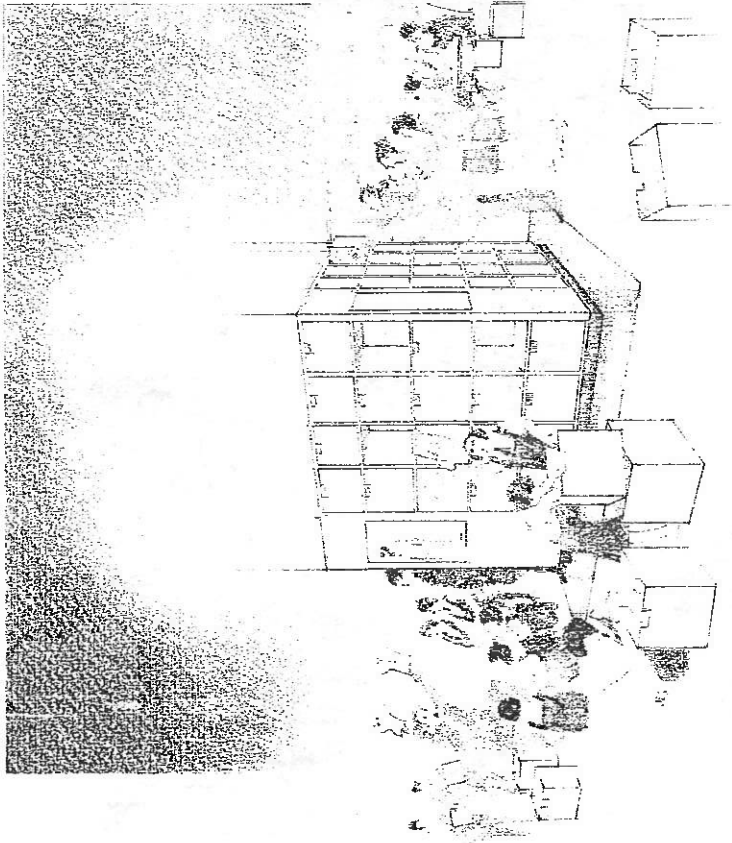
Discover Thailand:

The primary mode of communication is the “discovery box.” A discovery box is filled with replicas, minds-on questions, games, art projects, costumes, and artifacts related to a specific topic. These boxes allow for individual and small group experiences – especially families. The boxes can be organized by subject area such as archaeology in which case there would be boxes for fossils, plants, and early human tools. Another organizing principle is context. For example, the discovery boxes could be organized around **The 20 Things I didn’t Know About Thailand!** Thai medicine would be the subject of one of the boxes. A family would select it from the wall of 20 boxes and take it to a small worktable or comfortable floor space. Inside would be samples of herbs, activity cards, information about Thai medicine in the past, and how it is used today.

The boxes can be changed quite frequently to reflect shifting ideas and frameworks. They can relate to temporary exhibits (see potential list above) or coordinate with national events and holidays. Visitors will also be encouraged to create their own discovery box using materials provided by the museum. *This is what I think everyone should know about Thailand and it must be in the top 20.* The facility could be outfitted with recording devices so visitors can record and present their “exhibit” ideas and have a souvenir of their visit.

Primary learning styles engaged: Linguistic, Kinetic and Social

Discovery room with boxes.

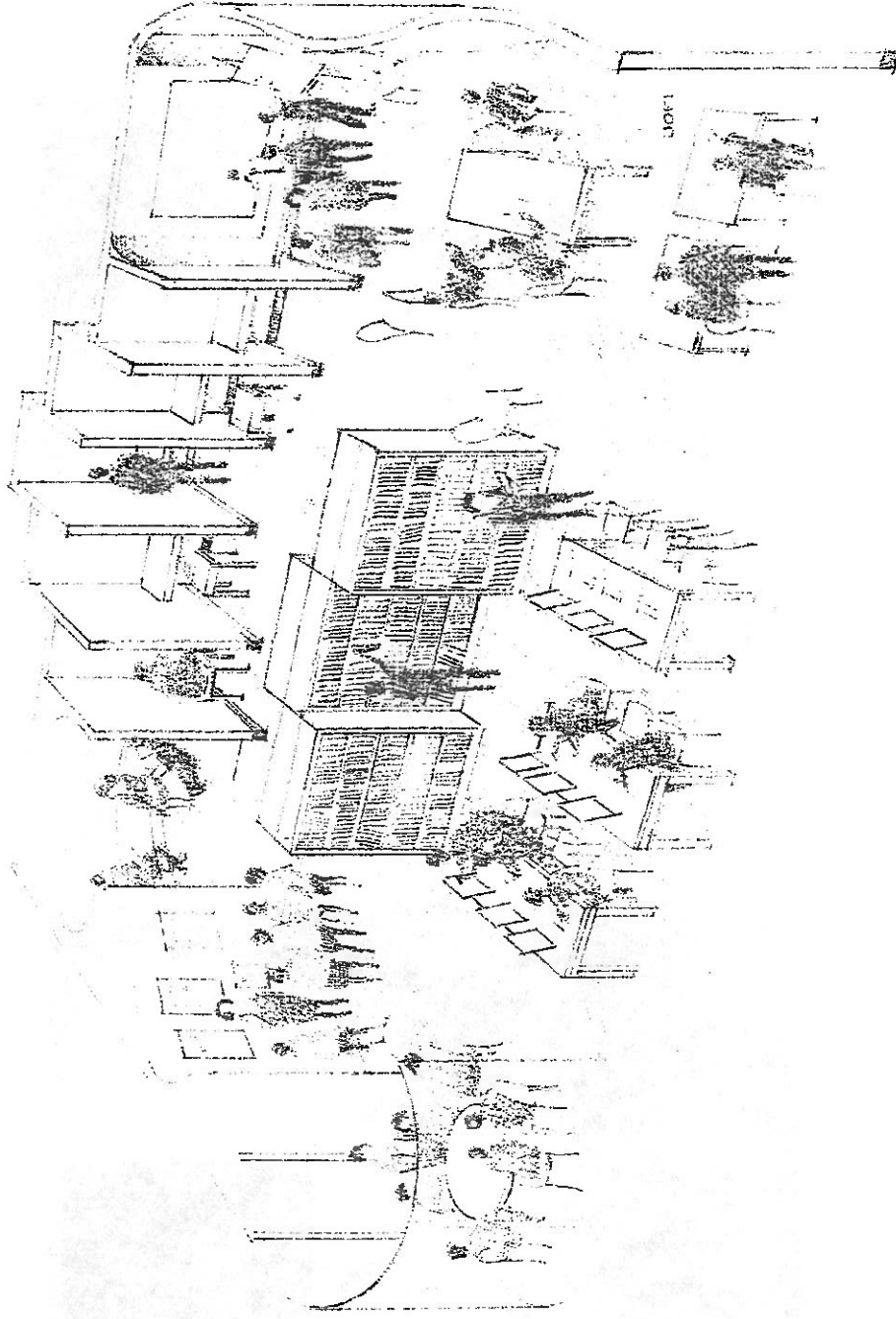


NDMI Discovery Boxes at Central World Plaza, Bangkok on launch of
NDMI's logo. Source: The Nation, August 25, 2005.

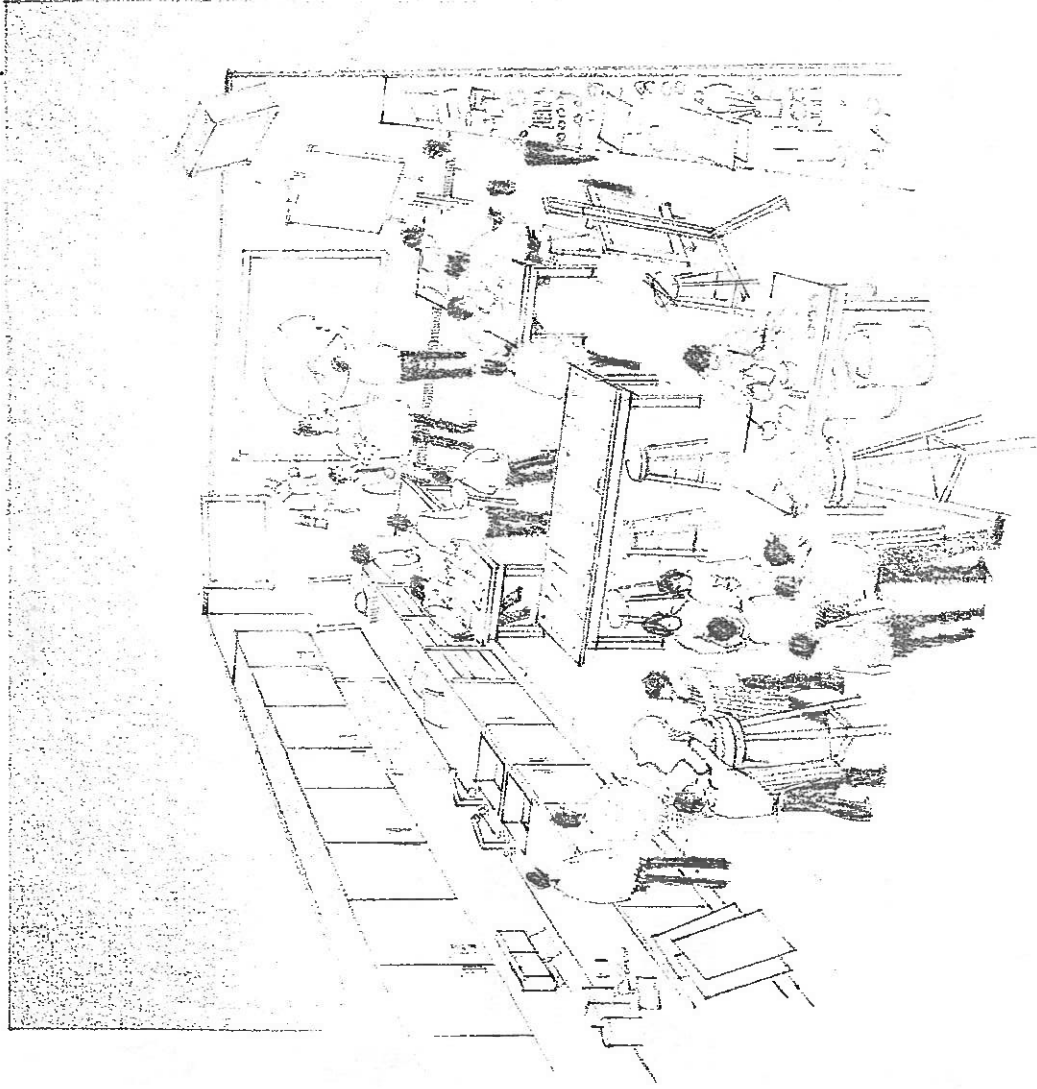
Resource Center

Visitors will access the Internet, CD ROMs, videos, recording equipment, books, magazines and other media to explore the art, language, culture and history of Thailand and Southeast Asia. The Resource Center will be used by school children for school projects and self-study. This high-tech area will also be used to train museum staff and teachers. Adult programming can focus on teaching people how to use the Internet, word processing and other software to encourage technological literacy.

Primary learning styles engaged: Linguistic, Logical/Mathematical, Musical and Visual.



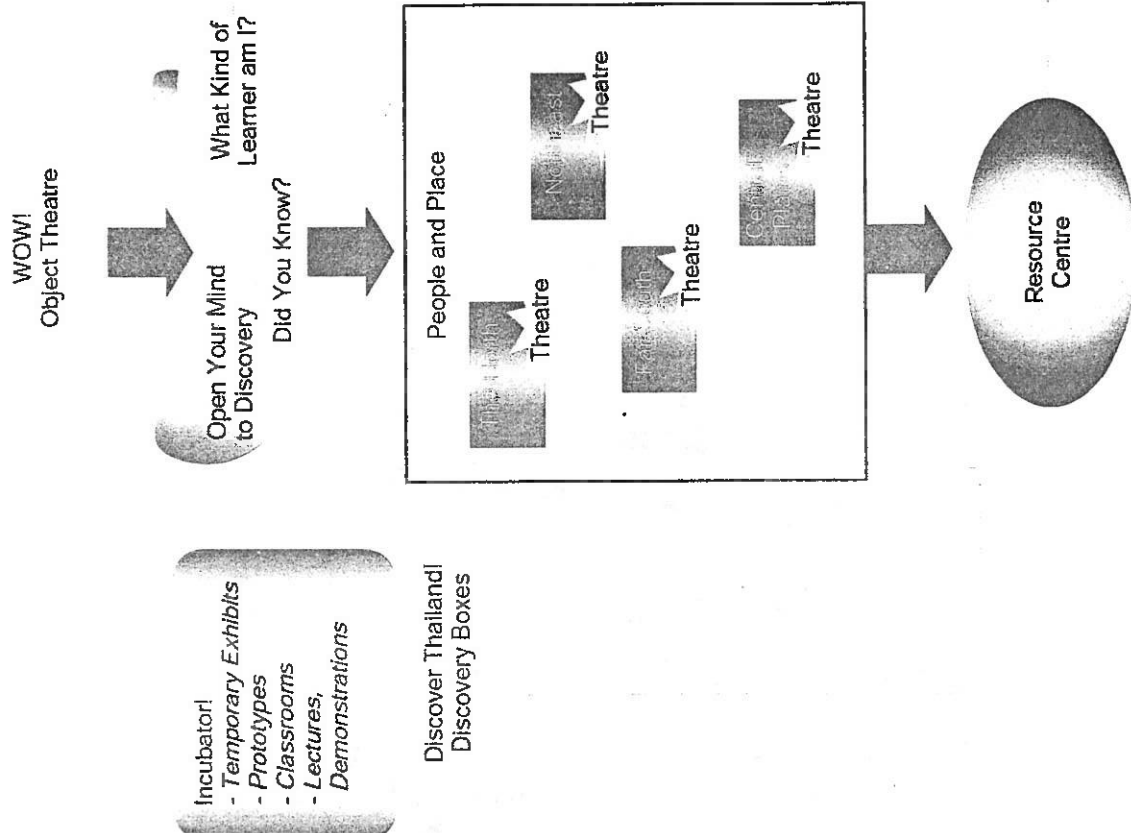
Artists' Workshop



People & Place: Regional/Cultural Exhibits

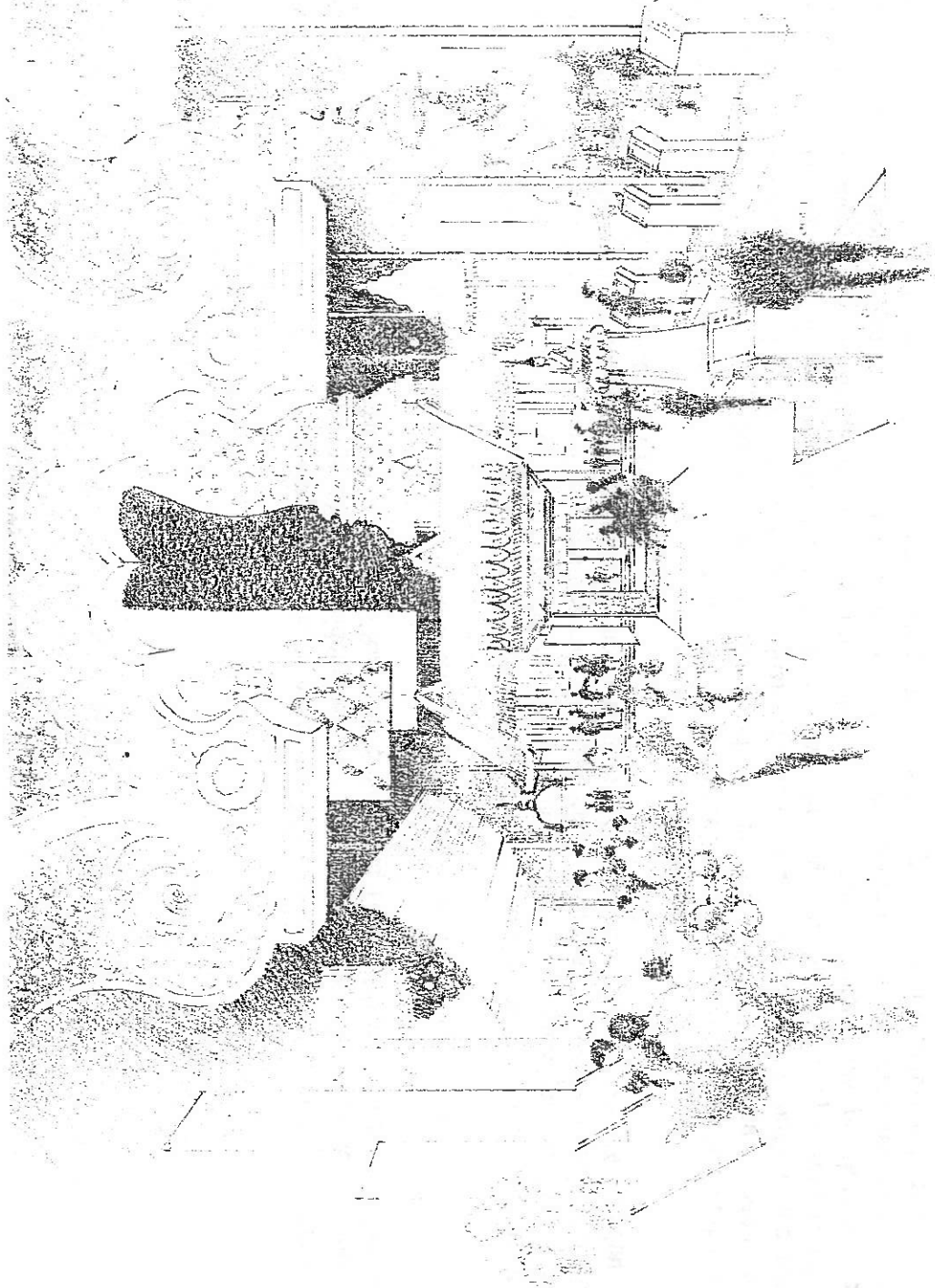
The exploration of Thai culture in the context of Southeast Asia will be based on a regional analysis. Each region is treated similarly with artifacts, interactive exhibits and a mini-theatre presenting the language, music, technology, particular histories, oral traditions and adaptations. The demonstration project will not present a comprehensive analysis of Thailand and Southeast Asia. It is more of a “marketplace” of ideas or “taste of Thailand” in which discovery learning is primary and content is secondary. The content will change over time within the established framework allowing, visitors and school groups to explore diverse perspectives on Thai identity and culture in an interactive and fun environment. The incubator, wow experience, open your mind to discovery, and media and resource library support this core content area.

The organizing principle will be regional. For example, the exhibit may be organized according to the four geo/political regions of Thailand: North, North East, South and Central Plains. Each regional exhibit will be anchored by a mini-theatre presentation and a reconstructed “walk-in” environment. All hands-on and media exhibits about the region focusing on diverse topics such as history, geology, politics, and culture will be organized around the “anchor” exhibits. Space will be provided for live demonstrations and storytelling.



Outreach
 Website
 New Museums Initiatives

Conceptual illustration that shows how gallery could look in Phase 2. A similar exhibition can be provided on a smaller scale in Phase 1.



4. Market Strategy, Revenue & Cost Projections

Overview

The purpose of this chapter is to better understand the market context in which the Museum will operate, and to recommend strategies (both operational and programmatic) for achieving the objectives identified in your Master Plan. This will be accomplished using Contextual and Comparables Analysis and an Assessment of Potential Resident, School and Tourist Markets for the new Museum.

To facilitate further stages of planning and development, we have presented a set of revenue and operating cost projections.

The present report expands the preliminary market strategy (of earlier reports) into a contextual analysis and assessment of market potential (4.1) with an expanded range of examples of museum precedents within Thailand. The following section expands the range of the analysis, providing and a set of three quantitative studies of comparable institutions from around the world (4.2). On the basis of the foregoing research we present a preliminary attendance estimate (4.3) predicated upon a set of stated assumptions (4.3.1) that will impact attendance and also shape the projections of costs and revenues.

All projections are based on assumptions about the size, nature, and content of the museum (i.e., determining its place in the market), and we have (in the present report) stated these assumptions explicitly in order to adumbrate the impact that planning decisions will have on expected attendance, and, conversely, how the museum will have to plan (space, facilities, services, and staff) to accommodate the estimated attendance. These assumptions will be subject to change (based on new planning decisions) and the projections will be subject to revision accordingly in subsequent stages of development. Based upon the potential attendance, we have provided a "Design Day" calculation (4.3.8), being a projection of visitor traffic in the building on a busy day for the purposes of determining the facilities and staffing requirements. Strategic recommendations for maximizing attendance are then presented in conclusion to this sub-section on attendance (4.3.9).

Sources of revenue and projections for income (by source) are then presented (4.4), followed by operating cost projections (4.5). At this stage of planning, limited information on capital costs is available (4.6), and this section will be expanded in consultation with a Thai government cost consultant to prepare the Indicative Construction Cost Estimate in advance of tendering the architectural competition documents.

4.1 Contextual Analysis & Market Potential

4.1.1 Size and parameters of the visitor market

Both domestic and international tourism to Bangkok has demonstrated rapid growth, including the growth of attendance at long-standing cultural attractions, and the emergence of several significant precedents for high attendance at educational and interactive new museums (i.e., the Children's Discovery Museum & Science Museum, discussed below, section 4.1.2). The Rattanakosin district presents an even stronger opportunity for a new museum, as it is at the center of a major concentration for both the tourist and student market. In terms of the public-service goals of the institution and also the likely pattern of attendance, student visitors are likely to be of equal significance to Bangkok's out-of-town visitors. A third market segment of special significance is Bangkok families living outside of a half-hour travel radius from the selected site. Although there is a widespread perception that the southern end of Rattanakosin is difficult to get to, there are already precedents of significant numbers of Thais commuting cross-town to attend ceremonies and festivals at Wat Po, or to shop at Pak Klong Talaat and its adjacent flower market. The improvements recommended to transport infrastructure (below) will further enhance the site and the "synergy" of shared visitor-traffic between attractions on the island.

Bangkok's population has demonstrated relatively modest growth in recent years (5,782,159 in 2002, roughly a 4% increase over a decade from 5,562,141 in 1992 [*Thailand in Figures*, 2003, Alpha Research Co.]) but the number of tourists to the city has rapidly grown, and continues to grow. Although 2003 represented a 7% decline from the all-time-record tourist arrivals of 2002 (10,799,067), the remarkable trend of international tourism to Thailand is demonstrated in that 2001's number of arrivals (10,061,950) is **double** the figure from a decade before (5,086,899 visitors in 1991) [*Statistical Report*, 2003, Tourism Authority of Thailand]. Domestic tourism has been actively encouraged by government policies and advertising campaigns exhorting Thais to explore their own country, and Bangkok has been the greatest beneficiary of this increased traffic. Domestic tourism to the city grew by 16% in 2003, exceeding 12 million per annum (plus an additional 7 million same-day visitors), and Bangkok attracts 24% of Thailand's total domestic tourism [*Ibid.*]. Thai tourists spend approximately 3,200 Baht per day per person in Bangkok. The revenue from Thai tourists who visit Bangkok is increasing every year. Last year 2003 it amounted to 139,465 million baht. The chart below-left shows the absolute size of Bangkok's potential visitor market, and the international arrivals chart (below-right) indicates the seasonal variation of international tourists.

Total International Tourist Arrivals (for all of Thailand)			
2003	Attendance	Percentage	Deviation
Jan	990,119	9.9%	1.6%
Feb	1,004,891	10.0%	1.7%
Mar	854,541	8.5%	0.2%
Apr	464,412	4.6%	-3.7%
May	399,602	4.0%	-4.3%
Jun	584,807	5.8%	-2.5%
July	831,608	8.3%	0.0%
Aug	926,641	9.3%	0.9%
Sept	823,843	8.2%	-0.1%
Oct	891,551	8.9%	0.6%
Nov	1,060,463	10.6%	2.3%
Dec	1,171,975	11.7%	3.4%
Total	10,004,453	100%	
Average	833,704		

The Size of the Visitor Market in Bangkok

	2003
Bangkok: Population*	5,782,159
Domestic Tourism to Bangkok**	12,337,764
Total Local Visitor Market	18,119,923
Foreign Tourism to Bangkok***	9,780,143
Total Visitor Market	27,900,066

* 2002 census data (B.E. 2545); source: Thailand in Figures, 2003

** T.A.T. Statistical Report 2003, pg. 88, excluding same-day visitors.

Including same-day visitors, the number increases to: 19,542,010

*** T.A.T. Statistical Report 2003, pg. 84-5

Although the Tourism Authority of Thailand provides excellent research on international tourism, it does not study cultural tourism as a separate category of visitors (this was discussed in an interview with Pickanet Sooksomchitar, of the T.A.T.). The term "Cultural Tourism" indicates a segment of tourists with a wide range of interests, including museums, heritage sites, theatre, and other cultural features unique to their destination (such as architecture). Generally, cultural tourists spend more money per visit, and prefer culturally vibrant centers of activity to isolated resorts. This category is used to exclude beach tourists or other purely recreational tourists, who may actively avoid museum attractions while on holiday. Cultural tourists have different visitation and spending patterns than beach tourists, and the existence of this separate category of visitor can be seen from comparing the seasonal attendance of the two cultural attractions below to the monthly breakdown of international tourist arrivals (above-right): while November, December and January are a significant "high season" for international tourism, the number of foreign visitors to the Grand Palace increases only slightly during this period (less than 2% in the two most impacted months). In comparing the seasonal "skew" of cultural attractions to total visitors, we

have a basic indication that cultural tourists are indeed arriving in Bangkok year-round, and their attendance pattern is less dependent on the weather. International tourists are attending "destination" cultural attractions on Rattanakosin Island in significant numbers, with more than 2 million attending The Grand Palace alone.

Grand Palace & Emerald Buddha (Foreign tourists only)			All Bangkok National Museums (under Dept. Fine Arts)				
2004	Attendance	Percentage	Deviation	2002	Attendance	Percentage	Deviation
Jan	226,655	10.2%	1.9%	Jan	51,283	12.3%	4.0%
Feb	180,138	8.1%	-0.2%	Feb	28,998	7.0%	-1.4%
Mar	161,494	7.3%	-1.1%	Mar	32,377	7.8%	-0.6%
Apr	160,261	7.2%	-1.1%	Apr**	54,565	13.1%	4.8%
May	150,130	6.8%	-1.6%	May	25,447	6.1%	-2.2%
Jun	148,240	6.7%	-1.7%	Jun	23,624	5.7%	-2.7%
July	195,983	8.8%	0.5%	July	31,165	7.5%	-0.8%
Aug	190,750	8.6%	0.3%	Aug	38,805	9.3%	1.0%
Sept	174,281	7.9%	-0.5%	Sept	37,401	9.0%	0.7%
Oct	193,934	8.7%	0.4%	Oct	21,823	5.2%	-3.1%
Nov	227,762	10.3%	1.9%	Nov	32,222	7.7%	-0.6%
Dec*	210,372	9.5%	1.1%	Dec	38,541	9.3%	0.9%
Total	2,220,000	100%		Total	416,251	100%	
Average	185,000			Average	34,688		

*The month of december 2004 is an estimate, based on prior years' performance
 **April of 2002 was anomalous; the same month drew 33,170 attendance in 2001, and 21,898 in 2002.
 Average april attendance (1997-03) was 28,691; the average drops to 24,379 if we exclude April 2002 as non-representative.

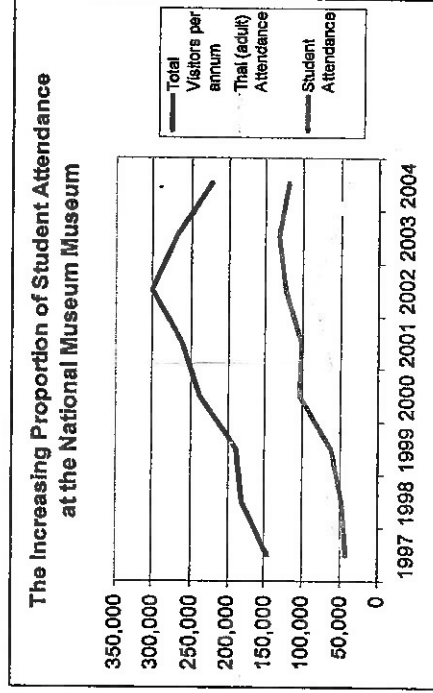
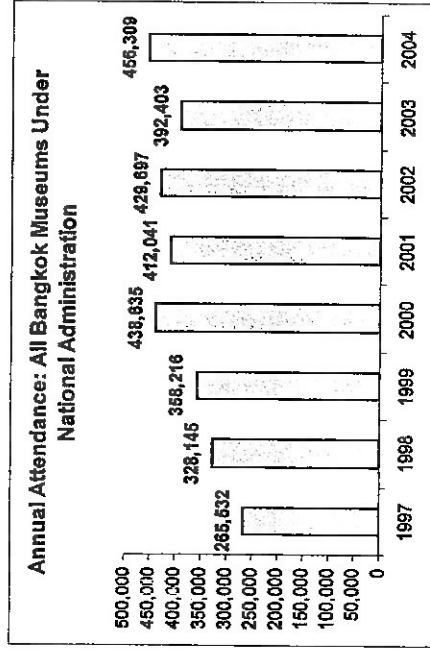
Sources: Internal documents provided by The Grand Palace; the National Museum's annual report ("Operation Plan") and attached documents.

The mandate of the museum places a special emphasis on attracting Thai visitors rather than targeting international tourists or relying predominantly on organized school groups. The precedents (discussed below) of both the Children's Discovery Museum and the Science Museum have attracted very high numbers of local visitors in their opening years despite major disadvantages of location, limited government support, and low advertising budgets, suggesting that the NDMI will be well positioned to attract significant numbers of Thais on first opening. Thai tourists to Bangkok (exceeding 12 million in 2003) constitute a special market segment, as they are likely to have an above-average interest in the thematic content planned for the museum. Unlike the division of international visitors into "Cultural" and "Recreational" tourists, most domestic tourism to Bangkok is (in some sense) cultural, but a large proportion of these visitors will be primarily interested in visiting family members or shopping, and will gain a secondary interest in cultural attractions such as the NDMI only after arrival, by virtue of publicity or the museum's "word-of-mouth" reputation.

4.1.2 The Student Visitor Market

While our research indicates an overall increase in visitation to Bangkok museums over time, the most significant trend has been the increasing numbers of school trips. In other words, the increasing ability of museums to harness the student market (and organized school-trips) has been a more significant factor than increases in the real number of domestic or international tourists in driving the upward trend.

As recently as 1998, the number of adult Thai visitors to the National Museum outnumbered student groups, but (as the charts below illustrate) student attendance has dramatically increased, while domestic (adult) attendance has actually decreased over the past 7 years. In 2004 (B.E. 2547) there were only 39,051 Thai adults to 119,934 students. The variability of adult Thai attendance to the National Museum (over the past 10 years) may indicate heightened sensitivity to the particular temporary exhibitions on offer in a given year: peak years have attracted more than 80,000 adult Thai visitors (1996 & 2002), but low years have dropped below 45,000 (1997 & 2004). The charts below show (1) the total increase in museum attendance for all Bangkok museums under the administration of the Fine Arts Department from 1997-2004, (2) the positive trend of student attendance (blue line) in contrast to the uncertain trend of Thai adult attendance (orange line) at the National Museum over the same period, and (3) the percentile breakdown of attendance by visitor type at each of the Bangkok museums under the Department of Fine Arts' administration.



Source: National Museum Operation Plan and attached documents, Fine Arts Department, 2004

National Museums in Bangkok, Oct. 2003 to Sept. 2004.						
	Foreign Visitors	Local Adults	Students	Monks	V.I.P. / Gov't	
The Bangkok National Museum	55,016	39,051	119,934	4,180	4,974	
Total attendance:	223,155	17.50%	53.74%	1.87%	2.23%	
Percentage:						
Royal Elephant National Museum	21,317	29,993	28,455	1,290	389	
Total attendance:	81,444	36.83%	34.94%	1.58%	0.48%	
Percentage:						
National Museum of Royal Barges	56,700	21,467	13,800	162	3,806	
Total attendance:	95,935	22.38%	14.38%	0.17%	3.97%	
Percentage:						
The National Gallery	7,892	9,389	7,594	86	26,388	
Total attendance:	51,349	18.28%	14.79%	0.17%	51.39%	
Percentage:						
Silpa Bhirasri Memorial National M.	613	1,349	1,850	3	14	
Total attendance:	3,829	35.23%	48.32%	0.08%	0.37%	
Percentage:						
National M. of the King's Golden Jubilee	7	0	440	0	150	
Total attendance:	597	0.00%	73.70%	0.00%	25.13%	
Percentage:						
Grand Totals:	141,545	101,249	172,073	5,721	35,721	
Attendance:	456,309	22.19%	37.71%	1.25%	7.83%	
Overall %:						
Averages:	23,591	16,875	28,679	954	5,954	
Attendance:	76,052	22.19%	37.71%	1.25%	7.83%	
Overall %:						

The importance of student groups to current museum attendance (in Bangkok) is reflected in the low percentage of the total tourist market that is currently attending Bangkok museums and in the success of two recent precedents in new museums that have been overwhelmingly driven by student attendance (the Science Museum and Children's museum, discussed below). The National Museums have been criticized for over-reliance upon school groups; however, the ability of the Bangkok National Museum to draw over 100,000 students every year is a positive indication of the size of the student-visitor market for a Rattanakosin museum.

The first-year student attendance at the Children's Discovery museum (over 100,000) is an indication of the responsiveness of the educational institutions in taking advantage of new museums to enhance curriculum. Even more impressively, the National Science Museum attracted 490,000 students in its first year open (2000-1), proving that bussing and dormitories can mobilize a large number of student groups and enable a (difficult to reach) museum to extend its reach across the greater Bangkok area.

Annual Attendance (rounded) for the Children's Discovery Museum

Year	2003-4	2002-3	2001-2
Adults	159,000	146,000	205,000
Children	42,000	70,000	106,000
Student Groups	35,000	124,000	126,000
Total	236,000	340,000	437,000
Estimated Local Penetration Rate*	1.17%	1.69%	2.17%
Total Market Penetration Rate	0.85%	1.22%	1.57%

* Assuming 90% of visitors are local, for the purposes of estimation

Source: Museum Vice-President Sujitra Wuttithamrong

National Science Museum

Annual Attendance (rounded) for the National Science Museum

Year	2004	2003	2002	2001
Total Attendance	535,000	487,000	525,000	706,000

Source: National Science Museum Annual Report 2003 & 2004 Presentation
 Note: free admission to age 23 and under

National Science Museum Attendance, 2003

Foreign Visitors	2%	Students*	92%
Bangkok Visitors	27%	Teacher/Govemnt	2%
Other Thai Visitors	71%	Adult / Other	6%

*Kindergarden, Primary, and High school included

Despite significant problems with its location, lack of car-parking space, and a limited budget for advertising, the Children’s Discovery Center drew 437,000 visitors in its opening year – this number is roughly comparable to the total annual attendance for all of the National Museums in Bangkok combined, but is believed to be composed predominantly of Thai nationals, rather than international tourists (thus, it represents a greater degree of “local success”).

The museum, now in its third year of operations, has demonstrated the classical pattern of dropping attendance following on an explosive opening year: the “boom-and-bust” cycle. The National Science Museum similarly dropped from an opening year with over 700,000 attendance to 535,000 at present (note: the Science Museum is under the administration of the Department of Education, and is *not* included in our totals for Department of Fine Arts Museums in Bangkok). Based on the usual pattern, attendance figures should “normalize” by about the fifth year of operations (*ceteris paribus*); and this process seems already to be underway, as 2004 represents an increase over the low of 487,000 in 2003.

The Children’s Discovery Center is building on its early success, and is currently constructing a major expansion, which may initiate another “boom” (likely to be followed by another dip in attendance). However, the expansion to the CDC will also expand its target audience (with specialized facilities and exhibits aimed at very young children and families with infants), thus raising the expectations for base attendance, and increasing the overall attractiveness of the museum in the long term.

This boom-and-bust pattern follows from the exhaustion of the local market: the majority of interested Bangkokians will see a new museum attraction in the first year of operations, and, thereafter, local attendance becomes increasingly reliant on temporary-exhibitions, specific promotions and outreach programs targeting local communities. One countervailing effect in the first five years is the gradually increasing proportion of visitors composed of out-of-town and international tourists; these groups are slower to respond to a new institution opening (e.g., it may be several years before tour-bus operators add a new museum as a stop offered on their tour, depending on the reputation the museum earns). Thus, the boom-and-bust cycle is somewhat exaggerated for museums such as the Children's Discovery Center because they predominantly target the local visitor market.

Conclusions and Further Considerations on Student Attendance

The first conclusion that can be drawn from the foregoing is that a museum with a prominent new building and contemporary exhibits can command a very high annual student attendance; *however*, both the appeal and capacity of a restored historical building (such as the Commerce building in phase one of the construction schedule) will be more limited. Attempts to quantify student attendance, along with some operating assumptions and recommendations, are presented in the attendance projections of this report.

As part of its educational and public-service mandate, it is generally assumed that the NDMI will maximize student-group attendance within the limits of its capacity. Further, it is assumed that student group visits to the NDMI will be received by specialized staff, during designated hours in which general admissions are low (e.g., weekday mornings) or during hours in which some or all of the museum is closed off to the public at large. The special needs of students to eat packed lunches, or have meals provided to them on-site, will normally require at least some area of the museum to be closed off to the general public during phase 1. Education spaces in the new building (in phase 2 of construction) will greatly facilitate the hosting of student groups.

Although over-reliance on mass student attendance has been the basis of criticism for the National Museum, this should not be interpreted to mean that high numbers of visiting student groups (per annum) are "bad" or "problematic" in a generalized sense. On the contrary, hosting students groups will be integral to the public service mandate of the NDMI.

In response to ongoing discussions on this issue, we may here state quite specifically that the problems with student attendance at the National Museum will not be experienced at the proposed NDMI:

- The majority of the exhibits have very little interpretation, and none of the labels or exhibits can be understood or enjoyed directly by children. Thus the content (and its presentation) is inappropriate for most of the school groups.

- The National Museum has no over-arching narrative or organization, and a great deal of the energy of the tour guides is simply taken up in preventing young children from becoming lost as they move (in a "chain" formed by holding one-another's hands) through the maze-like structure of the museum. The experience is actually *more restrictive* than classroom learning, and equally dependent on the role of the teacher "controlling" the students.
- The experience is further restricted because many of the artifacts have improper cases (or have no cases at all) and there is heightened concern in preventing the children from touching anything. As the Children's Discovery Museum demonstrates, children should be *encouraged* to touch and interact with museum exhibits, but these opportunities do not exist at the National Museum.
- The museum has limited hours, and visits of large numbers of students coincide with attendance from regular visitors. Around the world, it is standard museum practice to tour large school groups while the museum is closed to normal guests (e.g., in the morning hour prior to general opening) or to make use of off-peak hours (in cases in which drop-in attendance at off-peak hours is low enough to allow this). Closing at 4:00 PM, the National Museum is open for relatively short hours, during which tourists have to struggle for space to stand (in the generally cramped and confusing layout of the museum) among large groups of children.
- The fact that school-group attendance has increased *while at the same time domestic adult attendance had decreased* has fostered the perception that the National Museum is "only for children and foreigners". Although this perception is not entirely accurate, it has been repeatedly reported in interviews, and reflects the feeling of alienation that many Thais feel in relation to the traditional presentation of artifacts in an elite temple of high culture. *Breaking down the barriers of alienation between Thais and their own social history (as presented in classrooms and traditional museums) has been one of the explicitly articulated goals of the NDMI from the earliest period of the institution's inception.*

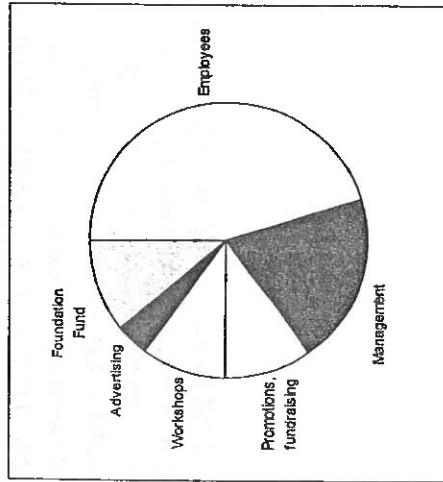
The current institutional context of high (and rising) reliance on the "involuntary" attendance of student groups in so many Bangkok museums has raised some questions as to the merits of attracting and encouraging such organized groups. *In as much as a museum's communication strategies are appropriate for children, it should seek to maximize school group attendance within the limits of its facilities.* This will be especially significant for the NDMI, as organizing school groups is one of the most effective means of outreach to urban poor. When children have a positive experience attending a museum, they can encourage their family and friends to return with them; and this "word of mouth" is one of the few forms of promotion that can cross social barriers, and extend an effective notice to all Bangkokians (including those with lower income and education levels) that this is not an austere temple of high culture, but a place of discovery in which they should feel welcome.

4.1.3 A Glance at Operating Costs for Some Bangkok Museums

As the charts below show, the Children's Discovery Museum is a significant precedent, both in its successful opening to a large audience, and in its innovative business model, using private-sector partnerships to ensure operational funding above and beyond the government's initial support for capital costs.

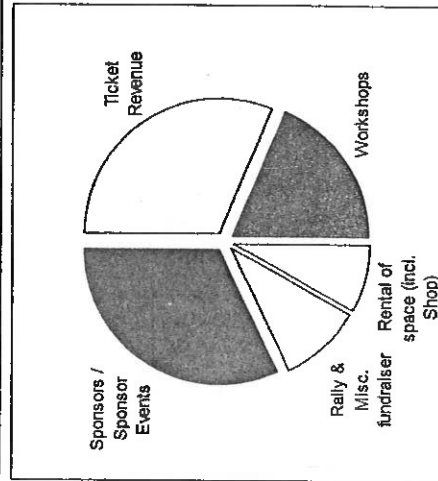
Children's Discovery Museum, 2003-4

Operating Expenditures 2003-4		Approx. Cost	Percentage
1	Employees	15,750,000	45%
2	Management	7,000,000	20%
3	Promotions, fundraising	3,500,000	10%
4	Workshops	3,500,000	10%
5	Advertising	1,400,000	4%
6	Foundation Fund	3,850,000	11%
	Total	35,000,000	100%



Children's Discovery Museum, 2003-4

Revenue 2003-4		Income	Percentage
1	Ticket Revenue	10,850,000	31%
2	Workshops	6,650,000	19%
3	Rental of space (incl. Shop)	2,800,000	8%
4	Rally & Misc. fundraiser	3,500,000	10%
5	Sponsors / Sponsor Events	11,200,000	32%
	Total	35,000,000	100%



The figures provided in the charts above are approximate, based on a percentile breakdown of revenues and expenditures provided by the Museum's Vice-President Sujitra Wuttithamrong. Although the target age group for the NDMI is older than that of the CDM (the latter is currently planning exhibits for visitors as young as six months!) the figures may be more indicative of the costs (or, the relative proportions of costs) encountered by a Bangkok museum using interactive exhibits rather than traditional artifact-centered museology of the National Museums.

Below, we review the operating costs for the Bangkok National Museum. Note that *staff costs are not included* in the publicly reported figures for the National Museum (perhaps because salary information is confidential); staff costs are often as high as 50% of a Museum's operating costs. We should also note that the National Museum's Operations Plan sometimes provides a zero-cost entry, where the cost has been paid for by another department (i.e., to note the activity, although it is not comprised in the museum's own budget). There are many conservation and restoration related costs in the tables below that are not comparable to the activities planned for the NDMI; however, some elements of the budget (such as the temporary exhibitions cost) may provide a useful set of comparative figures in present planning.

The National Museum, Bangkok; Expenditures, Oct. 2002 to Sept. 2003

Operating Expenditures 2002-3		
	Cost	Percentage
1.1	120,000	1.3%
1.2	90,000	1.0%
1.3	350,000	3.9%
2.1	6,608,000	73.2%
2.2	20,000	0.2%
2.3	50,000	0.6%
3.1	30,000	0.3%
3.2	50,000	0.6%
3.3	0	0.0%
3.4	500,000	5.5%
3.5	0	0.0%
3.6	30,000	0.3%
3.7	0	0.0%
3.8	50,000	0.6%
3.9	300,000	3.3%
3.1	150,000	1.7%
4	0	0.0%
5.1	79,200	0.9%
5.2	50,000	0.6%
5.3	50,000	0.6%
5.4	50,000	0.6%
6.1	100,000	1.1%
6.2	100,000	3.3%
6.3	250,000	2.8%
6.4-12	0	
Total	9,027,200	

Note: a zero cost may indicate an externally funded item

Activities Budget, Oct. 2003 to Sept. 2004

Activities 2003-4		
	Cost	Percentage
Children's activities	30,000	8.6%
Public Relations	200,000	57.1%
Thai Museum Day	15,000	4.3%
Special Youth Day	5,000	1.4%
Display development (e)	100,000	28.6%
Total	350,000	100.0%

Exhibitions Budget, Oct. 2003 to Sept. 2004

Exhibitions '03-4		
	Cost	Percentage
1 Tang On Shong Krung Rung Thep	190,000	6.3%
2 400 Years of Thai-Netherlands Relatid	800,000	26.7%
3 150 Years of King Rama V	360,000	12.0%
4 Thai Heritage Support by H.M. Sirikit	0	0.0%
5 Exhibition on Thai National Flags	405,000	13.5%
6 Ramayana special exhibition	1,245,000	41.5%
7 Ancient pictures of Magua	0	0.0%
Total	3,000,000	100.0%

Note: a zero cost may indicate an externally funded item

Quick Summary

The National Museum	
Operating Expenditures (2003)	THB 9,027,200
2004 Exhibitions Budget	THB 3,000,000
2004 Promotions & Activities (Includes advertising)	THB 350,000
Number of Employees (2004)	100
Gallery Space (Square Meters)	14,371
Annual Attendance	223,155
Number of Artefacts on display	11048
"Display Density" (artefacts per sq. m)	0.8

Source: The National Museum's Operations Plan, 2004, and attached documents

4.1.4 The Market Penetration Rate

Currently, a very small percentage of the local visitor market attends a museum in a given year. We measure the rate at which the visitor market's potential is being brought into a museum with a calculation called "the market penetration rate". This figure is shown below-left for the National Museum, and below-right for the aggregate of all Bangkok museums under the administration of the Department of Fine Arts: the *local market penetration rate* is simply an expression of the number of Thais attending (*per annum*) as a percentage of the total size of the local market (i.e., population plus domestic visitors to Bangkok *per annum*). The *foreign market penetration rate* similarly presents the percentage of the total number of international tourists visiting the museum, and the *total or overall market penetration rate* is an aggregate of the two. Note that this figure is based on the number of museum visits, not numbers of actual persons; market penetration could exceed 100% if a large enough number of people were repeatedly visiting the museum within a given year.

Annual Attendance for The National Museum (Bangkok)

	Year	2002-3	2003-4
Thai Visitors (adults)		60,196	39,051
Thai students		132,738	119,934
Total Local Attendance		192,934	158,985
Foreign Visitors		59,932	55,016
Buddhist Monks		5,449	4,180
Special guests (free V.I.P.)		4,588	4,974
Photography pass		2,788	**
Painting/Sketching pass		1,995	**
Total of Miscellaneous Visitors		14,820	9,154
Total Visitors		257,686	223,155
Local Market Penetration Rate*		1.11%	0.90%
Foreign Market Penetration Rate*		0.69%	0.61%
Total Market Penetration Rate		0.96%	0.80%

* Assumed that 50% of Miscellaneous visitors are foreign tourists

** These categories were not used for the most recent year's statistics.

Source: National Museum Operation Plan, 2003-4, and attached documents

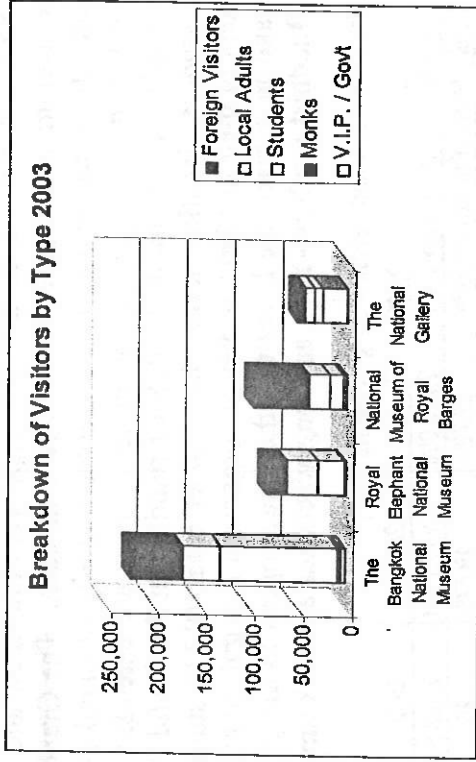
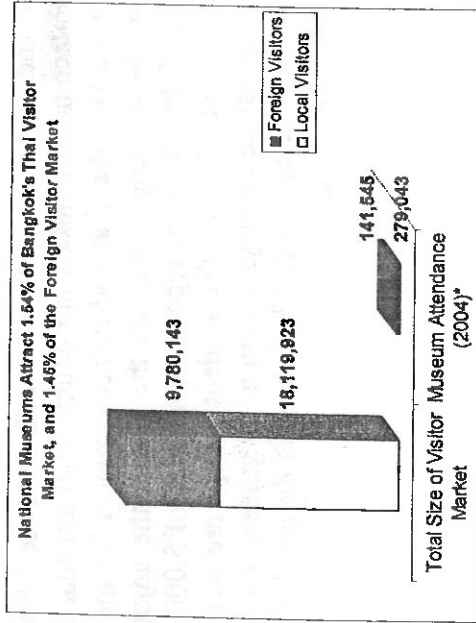
Sum of Attendance for All Bangkok Museums under National Administration

Museum Attendance (2004)*	456,309
Local Visitors**	279,043
Foreign Visitors**	141,545
Overall Market Penetration Rate	1.64%
Foreign Market Penetration Rate	1.45%
Local Market Penetration Rate	1.54%

* 2004 (B.E. 2547), defined as Oct. 2003 through September 2004.

Source: Internal document provided with the National Museum's Operation Plan

** Excludes government officials and their guests.



The illustration above-left indicates that market potential is far greater than the number presently attending Rattanakosin museums in Bangkok. The number of visitors is even less impressive when we consider that, because the museums are all within one area of the city, there is necessarily a large degree of double-counting persons who travel directly from one museum to the next.

Market Penetration Rates	Local	Foreign
National Museum (2003-4)	0.90%	0.61%
Children's Discovery C. (2003-4)*	1.17%	0.24%
Science Museum (2003-4)*	1.99%	0.55%
Wat Phra Kaew & The Grand Palace (2004)	**	7.96%

*The distinction of local vs. foreign visitors is an estimate for these 2 museums

**Thai attendance to the Grand Palace is free, unticketed, and uncounted

Summary of Market Size by Segment	
Bangkok Residents	5,800,000
Student Visitor Market	2,400,000
Domestic Tourists	12,400,000
International Tourists	9,800,000

All figures rounded; full calculations & citation provided above

The number of international tourists who visit Wat Phra Kaew and the The Grand Palace (a short walk from the NDMI site) exceeds two million per annum, at a ticketed rate of 200 Baht each. The Grand Palace neither tickets nor counts Thai attendance (which is free-of-charge), but interviews have indicated that the majority of Bangkok locals visit the Wat-and-Palace complex for special festivals and on commemorative dates, especially when open hours are extended into the evening (either on the site or the adjoining field, e.g., for fireworks displays). The head of customer relations at the Grand Palace (Mrs. Bunpen) reports an average of 5,000 students per month, with peak student visitation during the October break (8,116 students in Oct., 2004). The student groups are admitted free, but some record is kept of their numbers as they are organized into guided tours; the palace employs a team of 20 guides. As with the Museums of the Rattanakosin district, the hours that the Palace opens to the public limit the ability of Thais to visit during the week; Chinese New Year, the Buddhist Era New-Year, and long-weekends are peak times for local visitation.

Wat Phra Kaew & Grand Palace (Foreign tourists only)

Year	2004*	2003	2002
Annual Attendance (non-Thai)	2,220,000	1,923,541	2,563,868
ForeignMarket Penetration Rate	22.70%	19.67%	26.22%

*2004 Data is current to November 28th; estimation used for the month of December

Average daily attendance (2002)	5,270
Average monthly attendance (2002)	160,295

While the Grand Palace complex is part of the "Cultural Tourism" category for international visitors, it is a commemorative and ceremonial attraction for Thais, and is not directly comparable to a museum experience. While the Grand Palace may be educational for foreign tourists, it is neither promoted nor perceived as an educational experience for Thais, most of whom are already familiar with the dynastic and national narrative that visitors are introduced to in circulating through the temple and palace. This means that, in relation to the Thai visitor market, attractions such as The Grand Palace and Wat Po are not directly competitive with the NDMI; in fact, Thai visitors will be much less likely to visit these other attractions in the same day as the NDMI, in contrast with the likely behavior of international tourists, who are more likely to visit both if they are already in the area.

Both the NDMI and the Grand Palace provide opportunities to learn about Thailand and Thai-ness in the perception of an international tourist; but, for Thais, the NDMI will be perceived as a place of active engagement, education, and recreation --a marked contrast to the code of dress, behavior, and attitude associated with a Thai visit to a royal shrine or Buddhist temple. A significant portion of current Thai museum-attendance to the most-popular Museums is driven by the historical value of the temples and shrines attached to the museum, or of the museum buildings themselves; there is also a strong motivation to pay homage to the kings associated with the respective sites, irrespective of the content of the exhibitions. This is evident in the high level of Thai visitors to the Petchaburi's Nakhon Kiri Museum, with total annual attendance of over 400,000, making it the most visited single museum under the Department of Fine Arts. However, the latter is only in small part a "Museum": it is the former home of both Rama IV and Rama V, situated in a palace with a commanding view, atop a system of highly decorated Buddhist cave-shrines. The Museum component has fairly little educational content, and typifies the "ceremonial" tradition of visiting museums in Thailand.

It is clear that the envisioned NDMI will neither be directly comparable to (nor in direct competition with) institutions such as the Grand Palace or the Nakhon Kiri Museum. Indeed, even if a new museum wanted to replicate the limited success of an institution like Nakhon Kiri, this would be impossible: the appeal of visiting objects such as the bed that Rama V slept in would be eliminated were they to be reproduced (*ex situ*) in a modern museum format. New museums (such as the NDMI aspires to be) appeal to a visitor's curiosity, intellect, and need for recreation, and cannot reproduce the potent combination of religious sanctity and secular nostalgia that a temple-palace complex such as Nakhon Kiri provides. We may also note in passing that while Petchaburi is not a major center of tourism unto itself, it is situated as a very convenient stop-over for anyone traveling by car or by bus from Bangkok to Hua Hin (or to any of the beach resort attractions further south).

4.1.6 Precedents Outside of Bangkok

As part of our ongoing program of research trips and interviews, LORD has noted some significant developments in Thai museums outside of Bangkok. We here offer a few notes and recommendations drawn on those museums' past experience that may be relevant to planning.

4.1.6.1 A Discussion of the Word "Museum" and Naming Strategy

Both the Ayutthaya Historical Study Center and the Hall of Opium are significant precedents of museums attempting to break from traditional Thai museology, and to present visitors with innovative, educational (non-collections based) exhibits. Before examining these two precedents, we should note one feature they have in common: *neither one has the word "museum" in its name*. As we have learned repeatedly in interviews, *the Thai term for "Museum" has negative connotations*. The term was coined 1862 by King Mongkut (Rama IV), as a Thai adaptation of the Pali phrase *prapāsa bibidha bhandā*, meaning "to tour various materials" [Dhanit Yupho, *The Development of National Museums in Thailand*, B.E. 2533].

The Thai "p" sound replaces the Pali "b", and the first word of the phrase is omitted; thus, it is today pronounced "Pipithaphan". The original meaning of the term seems to have been preserved in the imaginations of many Thais; it is generally reported that this word for "Museum" suggests a warehouse of artifacts, with little in the way of educational content to reach out to the average visitor. *For reasons of public perception, both of these museums avoided the term "Museum", although they are quite definitely defined as museums in their function*. In English, "Study Center" and "Hall" are somewhat imprecise and confusing terms ("Study Center" might be assumed to be a library; and "Hall of Opium" seems to suggest an opium den!), but the Thai equivalents to these names are nevertheless more attractive to local visitors than "Pipithaphan". *It is recommended that the NDMI consider alternative names, omitting the term "Museum"*. LORD may suggest alternative names at a later stage of development, but it would be preferable for the final name to directly indicate the content of the museum –and the concept and content are still being refined (both by the Technical Committee and by the planning process encapsulated in these reports).

In general, at this stage, we should note that *the term "Discovery Center" should be sufficient to express the purpose of the building without the word "Museum" or "Institute"*. Names such as "Thai History Discovery Center", "River Ecology Discovery Center", etc., might be considered.

4.1.6.2 The Ayutthaya Historical Study Center

The Ayutthaya Historical Study Center opened in 1990, and made use of the high-tech exhibitry of its time. As with many museums that have their major subsidies and fund-raising organized around capital costs, the museum has not been able to update (or even adequate repair) much of this equipment in the 14 years since it was opened, and about 30% of the video-terminals are non-functional. Low-tech interactive displays (e.g., a push-button map with trade routes that light up for different periods) remain in good working order. The museum makes extensive use of recreated scenery and miniature dioramas, with interpretive text panels throughout. Artifacts are used only rarely, but some "folk objects" illustrating daily life and trade (such as tools and household craft items) are presented as part of the recreated dwellings. As stated in their mission statement (below) the main mode of communication is through "models", both miniature and scale.

Confirming the comments made during our interview with Sujitra Wuttithamrong (of the Children's Discovery Museum) the primary mode of communication with Thai visitors is verbal: locals and domestic tourists strongly prefer guided tours, or other (informal) verbal interpretation of the exhibits. The central space of the Ayutthaya Historical Study Center seems to be designed with this in mind: it is an open area with three large replicas of different areas of the city (in different historical periods) around which guides circulate with small groups of visitors. This open area (with relatively little static interpretation) is banked with steps allowing tired visitors to sit while listening to the guides, and also leading up to the three "wings" of more dense historical exhibits.

The museum was founded with the following mission statement (which we have summarized from the museum's own publications); note the description of the nature and role of the exhibits:

1. To serve as a national research center engaged in Ayutthaya studies, i.e., the history of Thailand during the Ayutthaya period.
2. To serve as an historical museum providing informal education to the public. Permanent exhibitions in the museum are unique in their attempt to recreate the social and cultural life of Ayutthaya in the past through models of various structures, communities, activities, and historical artifacts no longer in current use. All these models are recreated in compliance with historical evidence and research findings.
3. To serve as a library and historical information center specializing in Ayutthaya history and housing books, articles, memoranda, dispatches, paintings, pictures, objects, utensils, materials, etc., pertaining to Ayutthaya.

The museum was made possible by donations from the Japanese government, and was carried out by the Ministry of the Interior (under the support and guidance of the then finance minister H.E. Sommai Hoontrakool) rather than the Department of Fine Arts. The museum was built on Ayuthaya's former Japanese quarter; the land was donated to the government for this purpose by the Thai-Japanese Association.

Although the Ayuthaya Historical Study Center is a somewhat dated precedent (and appears older than it is because the exhibits have not been updated since opening) it remains an interesting and significant example of an educational, people-oriented museum, using modern exhibitry and interpretation to explore local history (rather than artifacts).

4.1.6.3 The Hall of Opium

The newly opened Hall of Opium is a social history museum located a few kilometers north of the town of Chiang Saen. Whereas the Ayuthaya Study Center is purely a history museum, the Hall of Opium has many interesting points of comparison to the planned NDMI. It exhibits social-science, agricultural, chemical, medical, and other educational narratives branching off of a central social history. Like the NDMI, the Hall of Opium also plans to open a resource center that will both serve researchers and the average visitor; but the latter facility remains in development, and is not yet open to the public. Throughout history, opium has had impacts around world, but the museum has a special focus on India, China, and Thailand (treated in the order in which they became major opium-consuming nations), opening with a film about the Royal family's ongoing (30 year) campaign for the transition from opium to legal crops. The museum is planning a further gallery (at the conclusion of the visitor experience) focusing on the numerous visits of King Bhumibol Adulyadej (Rama IX) to tribal peoples in the golden triangle area.

The Hall of Opium began with Her Royal Highness the Princess Mother, Somdej Phra Srinagarindra Boromarajajonani's, rural development project in the region (now known as the Doitung Project). The museum was planned as part of the development project from its inception, and was envisioned as serving a "demand reduction" role (in relation to the project's primary goal of supplanting the cultivation of opium). The capital costs for the project were partly provided by the T.A.T. and also partly through a Japanese "loan-fund" program; a significant (but unknown) portion of the costs had to be raised through charitable donations, and the building remained empty for over two years (after construction was completed) while funds continued to be raised for fitting-out costs and exhibit fabrication. The museum opened this year, and has been very positively received by locals and tourists.

With the exception of two nearby resorts, the Hall of Opium is in an isolated location, and primarily draws its attendance from bus tours (of which many travel through or to the golden triangle and/or to visit tribal peoples in the area) and student groups. Students are transported to the museum from across the region, with the funds for transport donated by the Honda automotive corporation. Other than school groups, Thai tourists (in families) do visit the museum in significant numbers, but the museum's limited hours constrain their attendance to long weekends and holidays such as the Chinese New Year (the last admissions are at 3PM, allowing two hours to exit). Admission for foreign visitors is 300 Baht, with free admission extended to school groups and other outreach programs, such as organized tours of locals (including tribal peoples). Because the museum is currently in its first year of operations, attendance statistics were unavailable.

The Hall of Opium's exhibits were designed by Siam Studios, and feature many immersive environments and interactive elements. The major methodological decision made by the museum was to order the majority of the space as a timed experience. The visitor halts to experience various films and voice-overs while proceeding through the museum in a linear fashion, with free movement only within thematic areas (e.g., the area on Chinese history has a timed experience at both the beginning (a voice-over with sequentially illuminated manuscripts) and the end (a film), but in-between these there is an exhibit hall in which visitors can circulate at their own pace. The overall space is organized into timed and thematic units in this manner, with an estimated average visitor experience of about two hours, and some visitors (with a higher level of interest) staying for three hours. Several stand-out exhibit areas include a scale recreation of a ship with a simulated sea-front environment surrounding it; the visitor steps through an opening in the ship's hull to find it laden with opium. They also make use of full-size recreations of architectural features such as Chinese traditional buildings.

In our interview, the chief researcher reported that the most successful elements were "low tech or medium tech", and that high tech interactive equipment had required more maintenance than anticipated. One of the major difficulties encountered in the process of concept development, exhibit design, and fabrication was the lack of competent project management: the T.A.T. directly employed the myriad contractors and sub-contractors, who did not report directly to the museum's staff. Protracted difficulties ensued, with no museum specialists among the people directly involved in the disputes. One of the triumphs of the project has been its continued co-operation with Doitung community development organization: at present, all of the museum's front-of-house staff, and also its team of gardeners, were hired from Doitung, and continue to live in the community. Overnight housing is provided on-site for the gardeners, who continue to commute regularly between the site and their mountain homes. The director of research also warned that the political leadership for new museum projects tend to under-estimate the time required for concept development. Because of a small research staff (a team of 7 at its largest) the Hall of Opium spent fully 10 years in preparing the museum's content.

The primary significance of the Hall of Opium (for the planning purposes of the NDMI) is that it demonstrates the viability of creating an entertaining, education-oriented museum to the highest standards of contemporary recreated environments and displays *using only Thai contractors and designers*. Conversely, difficulties were encountered in producing the exhibits on schedule precisely because the project relied upon a diffuse organization of contractors and sub-contractors (none of whom had their primary expertise in museum planning) without project management of any kind (except for the role of oversight played by the T.A.T.). Like the Children's Discovery Museum, the project further demonstrates the depth of philanthropic support for educational museums of this kind. Conversely, the time required to organize charitable support and raise funds to meet the target was greater than planned for the Hall of Opium (likely because the thematic content was unlikely to present advertising and public-profile raising opportunities for corporate sponsors).

4.2 International Comparables

In consultation with the NDMI, we have selected three examples of institutions from around the world for a brief study of the ways in which they accomplished public service mandates that in some sense overlap with the envisioned role of the NDMI in Bangkok. In terms of the NDMI's aspiration to create a learning center for the local community, the Minnesota History Center (St. Paul's, Minnesota, U.S.A.) has successfully created a library and research center (focused on local history) and serves as a central hub of a network of historic sites and houses across the state (reflecting one of the long-term intentions to make the NDMI serve as a center for historical sites and houses across Thailand). The Horniman Museum (London, U.K.) has an outstanding record of public outreach, trying to transform the Western tradition of ethnographic museums by reaching out to London's minority communities (and representing their social history, instead of just the artifacts of their cultures). The *Cité des Sciences et de l'Industrie* (Paris, France) is an outstanding and highly-successful example of a public institution with a clear mandate aimed at a range of age-groups, from young children to adults, situated in a "culture park" very different from the Rattanakosin district, but one which similarly boosts attendance through the synergy of multiple indoor and outdoor attractions.

4.2.1 The Minnesota History Center

The Minnesota History Center incorporates within it a central museum, archives and research library at the center of a network of museums and historical sites cared for by the Minnesota Historical Society. Researchers can get access to information and collections in all of the disciplines covered by the Society easily and quickly –whether they are ordinary citizens interested in their family genealogy (or the history of their own house) or professionals, all are welcome in their inquiries.

The Historical Society is a private not-for-profit agency (501-(c)-3) responsible for operating a wide range of museums and historical sites throughout the State of Minnesota. As an independent body it has access to a wide range of earned and contributed sources of income but continues to be heavily subsidized by the State of Minnesota. Unfortunately, with declining support from both State and Federal levels of government, it has suffered from severe budget cutbacks in recent years.

In some cases, data reported on below are available for only the Historical Society in its entirety, but are provided for the History Center alone where possible.

Historical Society Mandate

The Minnesota Historical Society is a private, non-profit educational and cultural institution established in 1849 to preserve and share Minnesota history. The Society collects, preserves and tells the story of Minnesota's past through interactive and engaging museum exhibits, extensive libraries and collections, 25 historic sites, educational programs and book publishing.

Physical Facilities (Minnesota History Center only)

Total Building Size (gross square meters)	40,000 (1999 data)
Total Exhibition Space (net square meters)	4,100 (1999 data)
Theatre Space(s)	Concert and Meeting Hall; 314 seats (1999 data)
Food Service	Heffelfinger Room, seats 60-100; Café Minnesota, seats 120 (1999 data)

Total Capital Cost (including site development, building renovation, exhibits)	\$77.8 million (1999 data)
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Admission Charges (Minnesota History Center Only)

Adults	\$8
Seniors	\$6
College Students	\$6
Children ages 6 to 17	\$4

Reported Attendance Totals - Minnesota Historical Society (All sites)

Year	All MHS sites
2003	1,100,000

Source: 2004 AAM Directory

Membership Program

Membership Charges by Levels	
Individual (benefits for one adult)	\$50
Senior Individual (ages 65+)	\$45
Household (benefits for two adults and children 18)	\$60
Senior Household (age 65+)	\$55
Associate	\$125

Contributing	\$250
Sustaining	\$500
North Star Circle	\$1000+

Sources of Support and Revenue - Minnesota Historical Society

MHS (All Sites)	2003	2004
State Appropriations	67.80%	50.6% or \$22.1 million
Federal, State, and County Grants and Contracts	4.40%	7.50%
Support from Individuals, Corporations and Foundations	9.70%	11.9% or \$6 million
Earned Income	18.10%	30%*

Source: 2003 MHS Annual Report, statistics inclusive of all sites

* A number of factors may have contributed to the drastic increase in earned income in 2004 from 2003. MHS reported a 15.3% biennial budget reduction in State support from the previous biennium which presented a need to develop other revenue sources. The Society also transferred seven historic sites to community-based funding which may have had an impact; meanwhile the opening of the new Mill City Museum in 2003 likely had a positive impact on revenue generation.

Sources of Operating Expenditures – Minnesota Historical Society

Cost	2003	2004
Total Operating Expenses	\$3,113,073*	N/A
Salary & benefits as a % of the total	54%	52.8%**

*Includes amounts paid to the State of Minnesota Department of Administration for maintenance and building services for public spaces; and auxiliary activities and services at the History Center, such as the museum shops, parking, café, and building rental.)
 **Staffing costs were cut back in fiscal year 2004 to reflect the decline in government support

Sources: Form 990 of MHS for fiscal year ended 6-30-2003, 2003 MHS Annual Report, statistics inclusive of all MHS sites

Personnel Profile – Minnesota Historical Society

Staff	2003 AAM Directory, inclusive of all MHS sites	2004 MHS Annual Report
Full-Time Paid	360	N/A
Part-Time Paid	260	N/A
Part-Time Volunteers	1,340	Over 1,700
Interns	35	

Collections – Minnesota Historical Society

Objects, manuscripts; Minnesota state archives; collections of historic & prehistoric archaeological materials to 19th & 20th-century material culture; paintings; maps; photographs; material documenting & describing the history of Minnesota & the Upper Mississippi Valley & Great Lakes Area (2003 AAM Directory, inclusive of all Minnesota Historic Society sites)

Exhibitions and Programs

The Minnesota History Center has a series of permanent exhibits about the natural history, prehistory, ethnography and history of the state. Of particular interest are its major exhibitions based on the excavation of early fur trade and settlements sites, Native American ethnography and an introductory exhibition called Minnesota A-Z, which explores the essence of what is characteristic of the State and its diversity of people. Educational programs are well-developed, using a combination of paid education specialists and volunteer docents.

4.2.2 The Horniman Museum

Founded by Victorian tea trader Frederick Horniman in 1901, the Horniman has long been one of London's museum gems – smaller than the major nationals and in a suburb of the city within a park setting. It has a personal, friendly feel, very popular with family visitors. Its physical size is also far more manageable as a single visit than many other of the larger museums in London.

The collections of the museum reflect a collecting focus common to British institutions in the Victorian period, particularly in relation to the anthropology. The new displays mounted in the extension to the traditional building has been an opportunity for the Museum to reassess how it interprets and presents these collections in a more sensitive and inclusive way.

A strong program of education and events also adds significantly to the life of the Museum – the Horniman has earned a strong reputation for school-education programs, facilitated by a new education center as part of the 2002 capital development.

The Horniman Museum has a strong connection to its local community, and attracts the bulk of its audience from its neighbouring South East London boroughs.

Aims and objectives of the Museum

The Museum's stated aims are to use its world-wide collections and its gardens to encourage a wider appreciation of the world, its peoples and their cultures, and its environments. To achieve this in both the shorter and longer terms, it intends to make the collections as accessible as possible now and in the future through their effective management, care, research and development; to use the collections to stimulate curiosity and wonder, promoting opportunities for people of all ages, abilities and backgrounds to participate in and enjoy exhibitions, activities and events; to secure and effectively manage financial and human resources in order to provide high quality services and facilities for the benefit and enjoyment of visitors

Governance and resources

The Horniman Museum is a charitable company, limited by guarantee. It is also a Non-Departmental Public Body of the Department for Culture, Media and Sport. This means that although it receives most of its funding in the form of Grant in Aid from DCMS, it operates at "arms length" from central government. The Horniman has a board of twelve trustees, four of whom, including the Chairman, are nominated by the Secretary of State for Culture, Media and Sport.

In 2002/03 it operated on a budget of £5.293 million, while in 2003/04 its budget was somewhat increased to £6.099 million. According to its corporate plan 2005-2007, the Museum's expenditure is estimated at £4,002,586 in 2004/05, £4,016,475 in 2005/06 and £3,953,512 in 2006/07. The Museum's income is estimated at £4,002,586 in 2004/05, £3,940,471 in 2005/06 and £3,845,790 in 2006/07. An average of £40,000 per year is projected to be spent on education and an average of £62,000 per year on exhibitions.

The Museum: physical setting, public gallery space and facilities

The Horniman Museum stands alongside the busy London South Circular Road, within easy reach of London's mainline stations. The journey from London Bridge to Forest Hill station is just over 10 minutes, with trains running every 10 minutes between the two. The Museum is well signposted at Forest Hill and accessible by foot within 10 minutes. There are also a number of bus services that run along this stretch of the South Circular, some of which stop directly outside the Museum.

The Horniman's original Victorian building and iconic clock tower, a landmark within this part of London, have recently seen the addition of new galleries and facilities. The modern extension, which was opened in 2002, is an attractive and sensitive reinterpretation of its older counterpart, which makes full use of glass, marble and white-coloured walls to create a sense of space and airiness. The visitor gains access to the main entrance by walking through the well-kept Horniman gardens, which offer panoramic views of London.

A twenty-year development plan for the 16 acres of listed gardens is also being gradually implemented. This will involve the restoration of original features and the development of a special garden feature with plants from around the world.

The Horniman's visitor facilities include a café (housed in the gardens), a shop, an extensive reference library (holding almost 30,000 publications on ethnography, natural history and musical instruments), and a conservatory (used for musical recitals, workshops and corporate events). The Museum and gardens are both wheelchair-accessible and have accessible toilets.

Audiences

The Horniman is situated in a culturally diverse part of London, close to socially deprived areas and makes active efforts to encourage participation in its developments and full use of its facilities. As such, it plans to grow and develop its audiences in an inclusive way in order for these to reflect the social and ethnic mix of the museum's surroundings, with a target for 2007 of over 300,000 visitors a year. These are to include school children, families, local residents, disabled people and tourists. Currently, 60% of their audience is comprised of families and another 10% are school-group visitors, which in total is very child and family oriented visitorship.

Exhibitions

Between 2004 and 2007, the Horniman intends to show one new exhibition a year generated by the Museum itself and three from an external source within the temporary exhibition gallery. It also intends to show one textile and two photographic exhibitions each year on the South Hall Balcony. In addition, the Horniman will be working with other museums with a view to touring exhibitions generated by the museum after they have been on show on its own premises.

Recent exhibitions include 'Dinomites' (February-October 2004), a commercial exhibition with a particular emphasis on baby dinosaurs. It has 14 major exhibits with a significant element of interactivity. From October 2005-October 2006, the Horniman will show an exhibition entitled 'From the Amazon to the Caribbean', using its own collections with some additional material from the British Museum.

Ticketing

The Horniman has always been free to all visitors and allocates the majority of its grant-in-aid to access.

Education

Education is at the heart of the Horniman's mission. Historically much of its reputation was built on the quality of its teaching programme, which spreads across a wide range of users from formal taught groups to family and self-directed learning. It includes the following:

- An extensive schools programme aimed at a wider range of students from nursery to college level students
- Family hands-on events and activities at weekends and holidays
- Discovery sessions using the Handling Collection aimed at children and family groups
- Arts and Crafts activities for children and families (Saturdays all year and daily during school holidays)
- Storytelling every Saturday for younger children
- Music workshops aimed at young people
- Nature exploration programmes for young people
- Hands-on sessions for community groups

The Horniman's Community Education and Schools' Education Teams are developing new programmes as more of the collections are being shown in the galleries or online. The Museum has taught on average some 25,000 school children annually using its own extensive handling collection of objects. The target number for 2004-05 is 30,000.

Special projects for 2004-2007 include 'Music without frontiers' (involving local schools, the Horniman and musicians and artists), 'Caribbean Identities' (seeking to facilitate a creative discussion amongst Londoners of Caribbean origin and using the Horniman's collection as an inspiration) and the 'Education Delivery Plan' (aiming to deliver education initiatives to some additional 5,000 school children in face-to-face teaching sessions at the museum and to develop an in-service training package for teachers).

History and nature of the collections

The Horniman Museum houses three distinct collections: ethnography (80,000 objects), natural history (250,000 specimens) and musical instruments (8,000 objects). In this, it follows the diverse interests of Frederick Horniman, a Victorian tea merchant and collector, who presented his collections and gardens to the London County Council in 1901. The collections have been systematically added to over the last 100 years, through fieldwork, transfer from other institutions, purchase and donations. This gives the Horniman's collections a continuing contemporary relevance and enables it to represent changing cultural and musical traditions from around the world and maintain close international contacts.

Staff numbers and staffing costs

In 2003 and 2004, the Horniman Museum employed an average number of 115 people (including temporary project contracts). The number of full-time equivalent employees in March 2004 was 97.2 (2003 - 90), divided into the following categories:

Employees	2003	2004
Management	4	4
Finance, Personnel and Administration	4.9	4.4
Systems	1.2	1
Conservation	3	3
Collection Services	7.1	10.5
Ethnography	2	2
Natural History	1	1
Aquarium	3	3
Musical Instruments	2	2
Education	7.6	6.5
Environment	1	0
Exhibitions	4.5	3
Library	1.3	1.3
Gardens	12	11
Marketing and Development	5	3
Commercial Activities	1	0
Facilities Management	17.8	16.9
Total	78.4	72.6

In 2003, salaries, wages and social security and pension costs totaled £2,408,629, a slight decrease from the previous year (due to the reduced number of staff shown above). These costs are depicted in the table of income & expenditures below.

The Visitor Experience

The airy atrium-shaped main entrance houses a well-stocked and tasteful little shop, toilets, a cloakroom, a payphone, as well as an information desk, where flyers and maps are available to help visitors find their bearings. The café, where lunches and afternoon snacks are served throughout the day, the Education Center and the visitor object-handling room are on the same level as the entrance hall and are within easy reach of the information desk. On the lower ground level are more toilets and a cash dispenser.

Wheel-chair access is made easier through the provision of automatic doors, a ramp and a lift. Orientation is facilitated not just by the information desk and the wardens on hand to answer questions but also by the large signpost at the center of the entrance hall. Clear signposts can also be found on walls throughout the Museum to ease way-finding.

There is no seating in the main entrance and overall there is little seating in the other galleries. Some exhibition spaces, in fact, have no seating at all.

The Natural History Gallery

This newly reopened gallery houses Victorian exhibits and an impressive walrus. The antiquated display cases are packed with stuffed mammals and birds, which are grouped together thematically by habitat or species. The animals are labelled and there are occasionally very small explanatory panels within the cases, but interpretation is largely minimal, if not non-existent.

The walls of the balcony space above the main gallery are covered with display cases covering a survey of the animal kingdom; here again, all animals are labelled and some explanation is occasionally included. This particular approach to collection display reflects the gallery's aim to recreate a Victorian experience and does not hold true for the rest of the Museum's exhibition spaces in which interpretation plays an important part.

The Environment Room

This small room contains informative panels on the natural world and the environment, with a little display relating to bees, including a living beehive and products made from honey or bees' wax. There is also a reading area largely aimed at children and young people. The beehive would no doubt appeal to children but the panels themselves are information-intensive and would suit a more adult audience.

The Aquarium

This room offers a colourful and attractive display of living fish with explanatory panels hung at a children-friendly level. Like the Natural History Gallery, the Aquarium was particularly popular with young children on our visit.

African Worlds Gallery

Contained in this spacious room is a colourful display of artefacts from the four corners of Africa, which range from large cement sculptures to wooden masks, Voodoo altars and Egyptian mummies. The display is introduced by way of an introductory panel, which pitches the exhibit as an exploration of different facets of the African continent. This imaginative exhibit is subtly lit, the cases are modern, the labels are informative and there are explanatory panels throughout the display. Included are also a couple of boxes with video footage relating to certain of the artefacts.

Above the gallery is a balcony where temporary exhibitions are shown. On our visit a series of photographs relating to Sufi music and textiles from Indonesia were on display.

Centenary Gallery

This room celebrates the Horniman's 100 years of collecting and examines the Victorian ideal of classifying a collection to illustrate the evolution of culture. The tall, modern cases contain a series of strange, colourful and exciting objects. While in general terms they are themed around the idea of collecting, these displays are subdivided on the basis of the artefacts' different types and/or functions (e.g. African and Australian masks, representations of Buddha, body decoration, social organisation). This makes for an interesting gallery and offers the visitor an informative experience, largely aided by the novelty of the objects and the effective explanatory panels. Despite the presence of school children drawing objects sprawled out on the floor, the exhibition space was large enough to accommodate other people.

Music Gallery

Like the Centenary Gallery, the Music Gallery contains large, modern cases with well-labelled objects, a themed approach and interpretative panels. Although the room is filled with several hundred musical instruments and the display cases have a rather cramped feel to them, this does not detract from the clear classification of the objects and the logical progression between one case and the next. Included in the gallery are listening tables where visitors can select an instrument on a touch-screen and listen to a musical extract, wall projections with changing images, video screens and a hands-on space where people can try their hand at creating music.

Exhibition Gallery

On our visit, this room was closed for the removal of an exhibition but usually acts as a temporary exhibition space.

Resources Center

The Museum is also home to a library, which is open to visitors throughout the week, an education center and an object-handling room called Hands on Base, where school children and members of the community are invited to discover and experience the Museum's collection first-hand in ticketed sessions.

Breakdown of Income & Expenditures

Note that in the first table below the Horniman provides transparent accounting of all their sources of revenue, but the majority of Museum operating costs are reported in a single category of "Activities in furtherance of charity's objectives". At the bottom of this page, the "Breakdown of activities in furtherance of charity's objectives" is the more useful table for understanding the museum's detailed operating costs.

Income	2004		2004		2003		2003	
	Pounds	Baht	Pounds	Baht	Pounds	Baht	Pounds	Baht
Grant in Aid	£3,281,000	฿232,951,000	£0	฿0	£3,377,830	฿239,825,930	£898,679	฿63,806,209
Heritage Lottery 2001 Grant	£0	฿0	£27,951	฿1,984,521	£43,216	฿3,068,336	£0	฿0
Other grants and donations	£27,951	฿1,984,521	£411,812	฿29,238,652	£166,460	฿11,818,660	£0	฿0
Activities in furtherance of charity's objects*	£411,812	฿29,238,652	£41,857	฿2,971,847	£18,542	฿1,316,482	£0	฿0
Activities for generating funds	£41,857	฿2,971,847	£23,495	฿1,668,145	£22,898	฿1,625,758	£0	฿0
Investment income	£23,495	฿1,668,145	£3,786,115	฿268,814,165	£4,527,625	฿321,461,375	£0	฿0
Total incoming resources	£3,786,115	฿268,814,165	£3,786,115	฿268,814,165	£4,527,625	฿321,461,375	£4,527,625	฿321,461,375
Operating Expenditures	2004 Pounds	2004 Baht	2004 Pounds	2004 Baht	2003 Pounds	2003 Baht	2003 Pounds	2003 Baht
Cost of generating funds	£143,453	฿10,185,163	£0	฿0	£83,312	฿5,915,152	£0	฿0
Charitable expenditure	£0	฿0	£0	฿0	£0	฿0	£0	฿0
Activities in furtherance of charity's objects*	£3,385,778	฿240,390,238	£3,385,778	฿240,390,238	£3,388,652	฿240,594,292	£3,388,652	฿240,594,292
Support Costs	£434,974	฿30,883,154	£434,974	฿30,883,154	£421,371	฿29,917,341	£421,371	฿29,917,341
Management and admin	£104,928	฿7,449,888	£104,928	฿7,449,888	£84,760	฿6,017,960	£84,760	฿6,017,960
Staff Salaries & Benefits**	£2,268,517	฿161,064,707	£2,268,517	฿161,064,707	£2,408,629	฿171,012,659	£2,408,629	฿171,012,659
Pension finance costs	£56,000	฿3,976,000	£56,000	฿3,976,000	£20,000	฿1,420,000	£20,000	฿1,420,000
Total expenditures	£6,393,650	฿453,949,150	£6,393,650	฿453,949,150	£6,406,724	฿454,877,404	£6,406,724	฿454,877,404

*Evidently, this category indicates the entire operating cost of the museum, excluding the other categories.

**The Horniman's own financial documents list the cost of staff in a budget separate from "Expenditures", not adding to one total

***Assumed exchange rate: 1 GBP = 71 THB

Breakdown of "Activities in furtherance of charity's objects"	2004		2004		2003 Pounds	2003		2003 Baht
	Pounds	Baht	Pounds	Baht		Pounds	Baht	
Object purchase	£38,943	฿2,764,953	£26,671	฿1,893,641	£26,671	฿1,893,641	1%	
Conservation	£129,724	฿9,210,404	£136,965	฿9,724,515	£136,965	฿9,724,515	4%	
Collections management	£258,733	฿18,370,043	£202,770	฿14,396,670	£202,770	฿14,396,670	6%	
Curatorial	£354,796	฿25,190,516	£308,177	฿21,880,567	£308,177	฿21,880,567	9%	
Education	£261,009	฿18,531,639	£281,644	฿19,996,724	£281,644	฿19,996,724	8%	
Environment room	£47,867	฿3,398,557	£0	฿0	£0	฿0	0%	
Exhibitions	£529,037	฿37,561,627	£465,994	฿33,085,574	£465,994	฿33,085,574	14%	
Marketing and publicity	£169,118	฿12,007,378	£256,626	฿18,220,446	£256,626	฿18,220,446	8%	
Visitor services	£360,447	฿25,591,737	£299,380	฿21,255,980	£299,380	฿21,255,980	9%	
Premises	£716,617	฿50,879,807	£826,455	฿58,678,305	£826,455	฿58,678,305	24%	
Library	£96,567	฿6,856,257	£95,969	฿6,813,799	£95,969	฿6,813,799	3%	
Event costs	£33,475	฿2,376,725	£29,141	฿2,069,011	£29,141	฿2,069,011	1%	
Gardens	£310,778	฿22,065,238	£289,896	฿20,562,616	£289,896	฿20,562,616	9%	
Current year revenue costs	£78,667	฿5,585,357	£168,964	฿11,996,444	£168,964	฿11,996,444	5%	
Total "Activities" budget	£3,385,778	240,390,238	£3,388,652	240,594,292	£3,388,652	240,594,292	100%	

Source: Homiman Annual Report 2004

4.2.3 Cité des Science et de l'Industrie

The *Cité des Science* is a science museum situated in an "Art Park" (*Parc La Villette*, Paris) with many surrounding outdoor attractions. Its exhibitions and facilities are specially geared toward family groups (who likely make a visit to the museum part of a full day of recreation at the park) including a "Children's museum within a museum" (*Cité des Enfants*) allowing parents to part with their children for a few hours, leaving the children under the care of museum attendants within this specially-designed, educational, children-only area.

Facility Availability and Sizes

Cité des Sciences reports 150,000 square meters of public space, including the following facilities:

- A 300-seat Planetarium
- A 400-seat domed theatre
- A 108-seat special theatre, the "Cinema Louis-Lumiere"
- A 56-seat simulator ride.

The museum maintains 5,000 square meters of permanent exhibitions, and an additional 5,000 square meters of temporary exhibitions (10,000 square meters of exhibition space in total).

It is also noteworthy that food service and retail operations are both concessioned out at *Parc La Villette*, including the museum. (The large majority of museums and science centers in western countries operate retail but concession out food service).

Operating Schedules

La Villette closes down for one day per week (including the *Cité des Science*) on a year-round basis to allow maintenance to take place. This reflects both the demanding, high-tech nature of the exhibits at La Villette, and also the sheer volume of the displays to be maintained over the huge campus, as well as within the science center. High tech exhibits can require extensive, ongoing maintenance, if the NDMI is open long hours (7 days a week) in Phase 2, the exhibits might sometimes entail the need for maintenance crews to work overnight. The museum is open 10AM to 6PM.

Admission Charges

Cité des Science charges separately for its domed theatre, planetarium and simulator experiences. School groups receive an unspecified discounted price at La Villette (likely admission is free to the students, with some form of agreement to cover costs worked out with public school boards; but this may vary for private schools, etc., in France) and account for 32% of all visitors. Children under 7 receive free admission at Cite des Science. The high percentage of children and school group visitors is consistent with science centers worldwide.

Admission Charges	Euros
Adult (ages 26 to 59)	7.5
Youth (ages 13 to 25)	5.5
Seniors (over age 60), mobility impaired, unemployed.	5.5

In addition to the prices quoted in the table above, there are a variety of surcharges for special theatres, rides, and exhibitions within the museum. These vary over time, but, as current examples of these charges, we may note that there is a 5 Euro surcharge for children admitted to the *Cité des Enfants*, and a 9 Euro (adult) surcharge for the *Geode* special theatre (reduced to 7 Euros for youths and seniors). A large special exhibition is 13.50 per adult, with reduced tickets (for youths and seniors) at 9.50, and a special offer of 45 Euros for a family ticket.

Attendance Levels and Appeal to International Tourists

Parc La Villette reports 2.6 million visitors per annum, with only 26% of that attendance composed of international tourists, reflecting its location in Paris (a city with strong traditions of recreational museum attendance among locals) and a substantial visitor experience. Evidently, the combined appeal of the Museum and the fairs, festival, and outdoor art displays in the park are inspiring a very high rate of repeat attendance from Parisians. *Within the total of 2.6 million visitors to the park, about 1.5 million visit the Cité des Sciences in a given year.*

Attendance per annum	2002	2001
	1,300,000	1,500,000

Operating Budgets and Governmental Support

Cité des Science has a very large operating budget of close to €121 million in 2003 (reflecting the tradition of state-funded museums under centralized administration in France). In 2003, 68% of the operating budget of the *Cité des Science* was provided by the French national government. For unknown reasons, the overall budget dropped slightly in 2004 to €115 million, while the percentage of the budget provided by government subsidy rose to 78%. This data confirms that even a very large, very high attendance, world-class attraction in a major tourist destination (like Paris) requires a substantial level of governmental support. This will also be the case for the NDMI.

Staffing Levels

Parc La Villette (as a whole employs) 1,052 people; of that total, the *Cité des Science* employs 810 full-time and 106 part-time staff. By any standards, this is an extremely large work-force for a museum attraction, but it is in part justified if we consider that the ratio of staff to visitors in comparison to benchmarks in Bangkok (i.e., with roughly 100 staff, the National Museum in Bangkok draws only 233,000 visitors per annum; with over 800 staff, the *Cité des Science* reports that it attracts over two and half million visitors). As is typical across the sector, staff costs are roughly half of the total annual budget (chart below). *Although LORD directly requested further details on the staffing and organization of the institution in an interview & questionnaire process, Cité des Science will not make any further data on their employment strategy public.*

Revenue	%	Euros
Admissions	7.8%	7,290,000
Gift shop, food service, & rental of space	3.8%	3,535,000
Subsidy (National government)	88.4%	82,270,000
Total		93,095,000
Operating Expenditures	%	Euros
Salaries/Wages/Benefits	45.5%	50,099,000
Exhibitions	10.6%	11,649,000
All other expenses (unspecified)	44.0%	48,439,000
Total		110,187,000

4.3 Financial Projections

4.3.1 Introduction to Stated Assumptions

In order for attendance estimates and financial projections to be credible, they must be based on clearly stated and agreed assumptions grounded in a common understanding of the nature of the attraction that is being projected. This section therefore summarizes *assumptions* derived from the research and analysis completed in this study, direction from the client, and from the knowledge and experience of the consultants.

The assumptions have been organized into the following categories:

- Site and External Environment
- Space Plan and Facilities
- Visitor Experience
- Operations
- Other Assumptions

There are many qualitative and quantitative elements of the planned museum that are comprised in the preceding chapters of the master plan, and are not restated in the following sections. In particular, we may draw attention to the fact that the space plan, facilities strategy, staffing, and interpretive plan all have direct impacts on cost, revenue, and attendance projections; however, it would be redundant to restate the content of the entire master plan in this section. Further, certain definitive aspects of the mission, mandate, and operational strategy of the NDMI have shaped the projections that follow: we may here draw special attention to the adopted *non-collections based* strategy for exhibitions and education. This strategy has very much reduced the scope of collections and conservation costs.

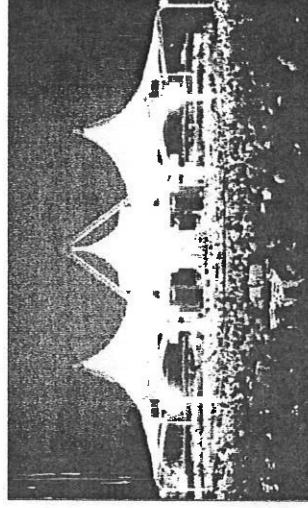
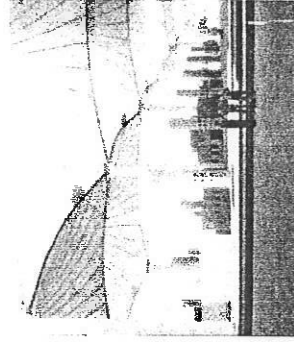
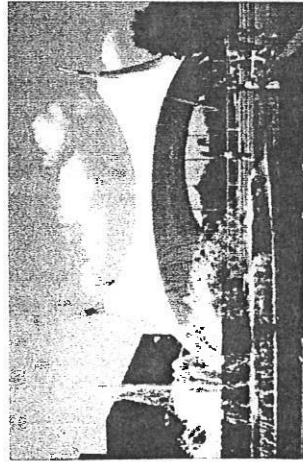
4.3.2 Site and External Environment Assumptions

1. *In phase one* the Museum will be housed in the restored Commerce Building
2. *In phase one* a free shuttle bus will link the site north to the major Rattanakosin attractions, and will link south to one of the existing express-boat piers on the Chao Phraya river.

3. *In phase one* the remainder of the office buildings between the commerce building and the detention center land will be cleared, and the open space will be utilized to provide for the following services:

- Parking for tour buses; parking for private vehicles
- Gardens adjacent to the commerce building, providing for outdoor cafe space, etc., by the wings of the building
- A "barrier" of greenery will be planted to block the view of the current police residence block, and to mitigate sound from the latter (as the demolition of the police-residences will proceed during phase one, as well as the beginning of construction on that property).
- There will be an attractive (temporary) public land use devised for this cleared area during phase one (or a sequence of such events) to draw the interest of the local population to the site. This could be a recreational, fair or market use; or a partnership could be devised with an existing cultural attraction to install outdoor exhibits or experiences (such as historical recreations, a miniature village, etc.) with a thematic link to the mission of the museum.

4. It is assumed that *in both phase one and phase two* there will be fabric-roofed structures to provide shade and cooling for outdoor uses, and also to increase the number of days that the outdoor areas can be used during the rainy season. These types of weather-meliorating structures will be essential to encouraging outdoor uses during the heat of the summer, and we may note that some low-quality tented structures are currently used (on a temporary basis) to enable large-scale outdoor daytime functions on Sanam Luang in front of The Grand Palace. High quality permanent or semi-permanent shading structures, used in conjunction with trees, fountains, and other cooling/shading garden elements, and available water and drinks, are assumed for all outdoor uses.



Above: Images of outdoor fabric structures.
Source: "Fabric Structures in Architecture", Horst Berget, *Structure Magazine*, November, 2004.

5. *In phase one* full restaurant services will be available on the site, supplying a needed amenity for which there are few substitutes in South-Rattanakosin
6. *In phase two* a newly constructed museum building will open to the public; underground parking may partly or wholly supplant the ground-level lot of phase one. The option of providing significant underground parking can only be endorsed by this report with the stated condition of a separate feasibility study being necessary; a full examination of engineering and economic aspects of an underground parking complex lies outside of the purview of this study.
7. *In phase two* the detention center site will be cleared, if not entirely redeveloped, and the new NDMI building will be visible from the waterfront. The redevelopment of the detention center land will provide a direct pedestrian link to the NDMI (possibly including a pedestrian footbridge over the road dividing the two sites), and will either become a stop on the existing river-boat lines, or will have a ferry of its own linking to the major river-boat routes.
8. *Improvements to the surrounding roadway system* will be made anticipating future development on the site and on surrounding lands.
9. It is assumed that construction related to phase 2 will not hamper or interfere with any of the functions described for phase 1, including visitor access to the site, and use of the outdoor spaces described above.

4.3.3 Space Plan and Facilities Assumptions

Many decisions remain to be made on the precise development and phasing of the building. At present, we assume that in Phase One, the commerce building will have about 2,200 net square meters of public space (Zone A + B), and the opening of the new building in Phase Two will expand this by about 4,000 square meters of additional public space.

The most direct impact on attendance projections is of the exhibition space; below, we provide a summary of these spaces as they are currently envisioned (although there are sure to be adjustments in subsequent stages of planning). *Note that the Queen's Foundation Exhibition Space will have its contents provided by the Foundation; the NDMI will not be programming or paying the cost for exhibits in this small space.*

Phase 1 Exhibition Spaces

Floor	Space	Sq. m.	Building	Description
1F	Queen's Foundation Exhibit space	80	Commerce	Exhibits TBD the Queen's Foundation
2F	CB Permanent Exhibits (2)	480	Commerce	Permanent Exhibits centering on 4 main theme areas - history, ethnology, natural science and ecology
3F	CB Temporary Travelling Exhibit	250	Commerce	Small travelling exhibit gallery which may be redeveloped for other uses in Phase 2 (ie, expansion of the Resource Center)

Phase 2 Exhibition Spaces

Floor	Space	Sq. m.	Building	Description
1F	Queen's Foundation Exhibit space	80	Commerce	Exhibits TBD the Queen's Foundation
1F	NDMI Temporary Exhibition Space	800	New Bld.	Exhibit area able to house travelling exhibits of international standard with full climate controls
2F	NDMI Permanent Exhibition Space	400	New Bld.	Permanent Exhibits centering on the main theme areas - history, ethnology, natural science and ecology
2F	NDMI Discovery Zones (2 x 50)	100	New Bld.	Discovery areas on each floor customized to amplify permanent exhibit content
3F	NDMI Permanent Exhibition Space	400	New Bld.	Permanent Exhibits centering on the main theme areas - history, ethnology, natural science and ecology
3F	NDMI Discovery Zones (2 x 50)	100	New Bld.	Discovery areas on each floor customized to amplify permanent exhibit content

1. *In phase 1* it is assumed that the resource center will provide a showcase for library and interactive area to engage the interest of scholars and average visitors alike. It is assumed that the growing collection of books and other resources will remain off-site in phase one, although the resource center may provide access to those resources indirectly or through loan-services. *A full-scale library component with all resources (such as library collections) is not assumed to be on-site until phase 2.*
2. *In phase 1* it is assumed that the seminar room and reception areas (with adjacent bar facilities) will be available for rental for private functions when they are not occupied with the museum's own public programming.
3. *In phase 2* it is assumed that the additional seminar rooms and the multi-purpose theatre will be available for rental for private functions when they are not occupied by the museum's own public programming.

4.3.4 Visitor Experience Assumptions

1. The demonstration project NDMI ("Phase 1") will be positioned as a social history and ecology museum using a thematic and cultural approach, with displays that are innovative and responsive in their presentation, offering a high degree of interactivity. Exhibitions will be primarily geared toward a Thai audience, taking into account average levels of education among Thais, making the content of the museum accessible to average Thai families and children through both "static" and spoken interpretation that they can understand, and that will inspire them to learn more in the research center.
2. *The Phase 2 building will have a space for a major temporary exhibition hall/gallery* (currently proposed at 800 net square meters) *meeting international standards for climate control, lighting, and security.* This is emphasized among the assumptions, as repeat attendance within the local market will be largely driven by temporary exhibitions, and a strong program of temporary exhibitions (including international, touring shows) will differentiate this museum from all others in Bangkok.
3. It is assumed that both temporary exhibition spaces (consisting of 350 net square meters in the commerce building and 800 net square meters in the new building respectively) will mount three temporary exhibitions *per annum*, amounting to six changing shows in total. These shows are assumed to be a mix of self-generated exhibitions and traveling exhibitions from international museums (or, hypothetically, outstanding exhibitions from provincial museums within Thailand could also be mounted in these spaces). The schedule of temporary shows will be staggered so that at least one of the two spaces will have an exhibition at all times (i.e., the two spaces should not be simultaneously closed for exhibition set-up, take-down, or renovation).

4. It is assumed that the NDMI will provide *live interpretation and animation*, as well as an ongoing program of lectures and seminars, some of which will be aimed at the general public (i.e., will not be intended solely for specialists, scholars, etc.). These educational programs will include:

- Special topic and educational tours
- Festivals and celebrations
- First person interpretation

4.3.5 Operations Assumptions

Admissions

1. Admission will be free to Thai citizens, and to organized school-groups.
2. Foreign tourists are assumed to be charged admission on the following schedule, reflecting a separate price for children (and other concessionaries), and separate ticketing for temporary exhibitions in phase 2. Note that the basic charge of 100 Baht admission for an adult, foreign tourist is directly comparable to the admission charge required for Jim Thompson House, and is half the rate of admission charged for the Royal Palace.

Admission Charges

	Phase 1	Phase 2
Thai citizens	Free	Free
Permanent Exhibitions		
Foreign Adult	100	100
Foreign Concessions	30	30
Special Exhibitions		
Foreign Adult	n/a	50
Foreign Concessions	n/a	15

Operating Schedule

It is assumed that the NDMI will be open (and admitting new visitors) until 7PM, significantly later into the evening than the current norm among public museums in Bangkok, in order to encourage after-work visitation from families and downtown employees. In order to save on staff costs, it is assumed that the museum might open to the general public somewhat later in the day than the norm, or that the museum might be open only to school groups in the early morning. This issue has been further discussed (with recommendations) in the section addressed to student group attendance (phase 2, section 5.1.2).

Membership and Volunteers

It is assumed that the NDMI will operate a membership program, pursuant to cultivating a culture of repeat visitors, rewarding patrons, and offering additional benefits and invitations to lectures and special events to members (i.e., anyone with a heightened interest in the museum). It is assumed that the NDMI will operate a volunteer recruitment and training program, and that membership benefits (or a special level of membership) will be extended to volunteers.

Retail and Food Service Operating Assumptions

1. In Phase 1, it is assumed that retail will consist of a small kiosk (with publications and merchandise specifically relevant to the NDMI), and a larger shop (of 80 square meters) will be operated by the Queen's Foundation (selling high-end items of apparel with traditional materials and craft elements). Revenue from the Queen's Foundation shop *is not* assumed to accrue to the NDMI.
2. In Phase 2, it is assumed that the NDMI will have a full-scale museum retail shop of 50 square meters in the New Building. Revenue from this shop and the kiosk in the Commerce Building are assumed to accrue to the NDMI.
3. It is assumed that food services will be "concessioned out", i.e., the NDMI will realize income from a rental agreement with a private food-and-beverage service operator rather than directly operating restaurant services themselves.

4.3.6 Other Assumptions

Estimates of future performance are subject to the inherent uncertainties of the future; it is therefore impossible to guarantee that the figures that result from these assumptions will be realized in whole or in part. Moreover, the estimates may be subject to modification based on changed assumptions and future circumstances. Nonetheless, we believe that the estimates that set out below will be reasonable.

4.3.7 Museum Attendance Estimates

There is no simple computer formula for estimating attendance levels at a new museum. That is because the most important factor influencing attendance levels is the nature and quality of the visitor experience offered to visitors. Attendance levels are impacted by the size and profiles of available resident, school and tourist markets, by operating policies ranging from admission charges to whether there are or are not incentives for museums to seek to maximize attendance and earned income, and by site and other factors relating to the location. Benchmarks for attendance levels may be established by use of comparisons with other museums, and such benchmarks have already been introduced in the "Market Context" section above (3.2). This section begins with such comparisons, then moves to consider the impact of site, market, pricing, visitor experience and other factors that help to guide one's judgment.

The place one needs to begin in preparing attendance estimates for a museum is to define what one refers to as a museum visitor. For the purposes of this analysis a visitor to the NDMI is defined as someone who attends an exhibition, performance, program, evening rental or event within the Museum. The definition of a visitor would exclude those who enter the building to only use the gift shop or retail stores, or who arrive just to eat in restaurants. It also excludes Museum staff and volunteers, service and delivery people. While outreach and access through the Web site are important, the attendance projections do not include outreach programs and Web site hits.

Most importantly, the attendance estimates count a person who attends the permanent exhibitions, a temporary exhibition and the garden as one visitor, not three visitors. The attendance estimates therefore exclude double or triple counted persons. We do not recommend that double counted visitors be included in attendance totals.

Parameters for Attendance Estimates

A variety of data may be used to help establish parameters for the attendance estimates of the NDMI. As is the case with any data that might be used for this purpose there are inherent strengths and weaknesses in using any one set of data to estimate attendance for a new institution. Thus, we examine several statistical approaches in order to establish parameters for its potential attendance, although each method has weaknesses. It must also be noted that comparing attendance levels is inherently risky since there are a variety of definitions of what constitutes a visitor and varying degrees of accuracy among reporting institutions. Moreover, there are differences in admission charge structures and substantial variations in the nature of the visitor experience offered.

As discussed in 3.2, total attendance at Bangkok's National Museum was 223,155 (2003-4). This figure includes visitors to permanent exhibitions, temporary exhibitions, shrines and gardens, but counts them as one visitor. An extrapolation based on the size of the exhibition space at each facility and the relative resident population base is helpful in establishing some quantitative benchmarks, as discussed below.

Visitors per Square Meter of Exhibition Space

The Bangkok National Museum has 14,371 net sq. meters of total exhibition space. The current assumption for the NDMI is that the Commerce building will feature about 1,000 sq. meters of total exhibition space (i.e., Phase 1). Applying the National Museum's rate of visitors per sq. meter to the NDMI would suggest an annual attendance as low as 3,600 visitors. The latter figure is not applicable, because (*ceteris paribus*) it would assume that the exhibitions at the NDMI are comparable in public appeal to those of the National Museum; however, we can see that this calculation does give a rough idea of how a relatively small museum (in an historical building) with comparable exhibits to the National Museum would perform (i.e., the traditional approach) –this figure is quite close to the annual attendance of the Sipa Bhirisai National Memorial Museum (3,829 in 2004; full table of attendance figures given in section 3.2). In other words, despite the strength of the Bangkok visitor market, a traditional museum in a traditional building can draw very low attendance.

The National Museum	
Annual Attendance	223,155
Gallery Space (Square Meters)	14,371
Visitors per square meter	3.57

Using the Bangkok Children's Discovery Museum as our benchmark for this same measure, we produce a radically different projection. At the Children's Discovery Museum's rate of visitors per square meter in 2004 (see chart below), Phase 1 of the NDMI (1000 square meters) would indicate 33,700 visitors. In Phase 2 (after the construction of the new building) this projection would triple to about 100,000. However, as discussed in 3.2, the Children's Discovery Museum is only partly comparable to the visitors that the NDMI should be capable of attracting, with its excellent location close to national tourism attractions. This figure is also less indicative because figures for visitors per sq. meter exhibition space decline the larger the facility (and the CDM is a much larger museum than the NDMI, with a low "display density" to allow children to run and play).

Children's Discovery Museum	
Exhibition Space (square meters):	7,000
Attendance (2004)	236,000
Visitors Per Square Meter	33.71

Although it is not representative of the Bangkok market, we may here make reference to the experience of the Asian Civilizations Museum, Singapore (which, like phase 1 of the NDMI, is situated in a restored historic building). The data for the Asian Civilizations Museum indicates a combined attendance total of about 230,000 visitors at its two sites in a combined total of 1,373 net sq. meters of exhibition space. That translates into 168 visitors per sq. meter of exhibition space. Applied to the 1,000 square meter exhibition space of the first phase of the NDMI, this would yield 168,000 annual attendance, or 500,000 after the opening of the new building in Phase 2. The population of Singapore in 2000 was about 4,151,000. With 230,000 visitors at the Asian Civilizations Museum, that yields a figure of 55 visitors per thousand resident population, which if applied to the local population of Bangkok, would be 318,000 (i.e., an upward adjustment from the figure produced from straight comparison of attendance per square meter), but in fact this would need to be still further upwardly adjusted as Bangkok's tourist sector is far more robust than Singapore's.

Asian Civilizations Museum, Singapore	
Exhibition Space (square meters)	1,373
Average Annual Attendance	230,000
Visitors per square meter	168

Ranking of NDMI Relative to Attendance at Other Major Museums in Thailand

The simplest, and perhaps the most reliable method of estimating attendance, is to rank the NDMI relative to other major museums in Thailand. The following Table indicates reported attendance levels. At this stage, it is useful to keep in mind where any attendance estimate would place the NDMI relative to this context of market precedents.

Museums Ranked by Attendance	
535,000	National Science Museum*
405,102	Nakhon Kiri National Museum**
236,000	Children's Discovery Museum
223,155	The Bangkok National Museum
95,935	National Museum of Royal Barges
81,444	Royal Elephant National Museum
51,349	The National Gallery
3,829	Silpa Bhirasri Memorial National M.
597	National M. of the King's Golden Jubilee

*Over 90% of attendance is student groups

**Not in Bangkok (Phetchaburi)

Estimated Attendance Levels

The norm for most museum-related institutions is that attendance levels will be highest in the first year then decline substantially in the second year. In section 3.2, and in the phase 1 report, we discussed this "boom and bust" cycle with reference to recent examples in the Bangkok market. This is because the novelty factor and the media attention paid to a new attraction are strong motivators for local attendance. After hitting a low in the second or third year, attendance levels will often gradually increase to a stabilized level as management becomes more aware of market preferences and patterns and adjusts programming and operations accordingly. The attendance pattern for the NDMI will differ in phase 1 (when the museum is constrained to the commerce building) and phase 2. Although the demonstration project may be very important for rallying public support (and philanthropic and institutional contributions) for the project, *it is likely that public excitement will focus on the opening of a major new building in Rattanakosin in phase 2 of the project* (especially if this is visible from the waterfront, as assumed) and that an historic building re-opening to the public as a museum will be of relatively little interest to Thais. Thus, for the "first opening" there will be more of a struggle to gain public attention.

4.3.8 Design Day Calculation

In order to gauge the implications of attendance levels on building design, we present below the "Design Day" calculations for the NDMI, based on the projections above. The "Design day" is not a "Peak Day", but represents single-day attendance for a very busy weekend day, during the busiest part of the season. A "Peak Day" is, by definition, the absolute busiest day of the year, which may be related to an extraordinary festival or event. The figure given for the peak number of visitors *in the building* takes into account that a significant percentage of visitors to the museum may be in the café, or circulating outdoors around the site, during a busy day, and represents a likely figure for the number of people *simultaneously* inside the museum.

Design Day Calculations

Bangkok NDMI

Phase One: Commerce building only	
Design Day Calculation	1,742
Average Weekend Day / Holiday Fri. or Mon.	1,514
Peak # of Visitors in Building: Design Day	697

Phase Two: Opening of the New Building	
Design Day Calculation	4,230
Average Weekend Day / Holiday Fri. or Mon.	3,678
Peak # of Visitors in Building: Design Day	1,692

Assumption: 96 Weekend days plus 8 holiday
 Mondays or equivalent (104 days) per annum

4.3.9 Strategic recommendations for maximizing attendance

The relationship of the site to the market may be optimized in relation to a number of distinct market segments, with distinct needs. "Destination visitors" and "incidental visitors" follow different patterns within one and the same visitor market; whereas destination visitors leave home with the intention to go to a museum, incidental visitors are pulled in, or spontaneously add the museum as a stop in the mid-part of the day (they are also called "walk-in" visitors). For example, a destination visitor will be more receptive to a "timed ticket" experience (involving guided groups, films, etc.) than an incidental visitor, for whom it may be a deterrent to have to wait for the next guided tour to begin, for the next film to start, etc., as they would prefer to explore the museum at their own pace, and then return to other activities. As a rule, incidental visitors will later return with friends or family as destination visitors, and are thus a doubly important market segment.

- **Destination visitors.** Needs: increased visibility, reduced transport time, longer visitor experience.
- **Incidental (or "Walk-in") Visitors.** Needs: attractive services, ease of access, low/no admission, option of a shorter visitor experience.

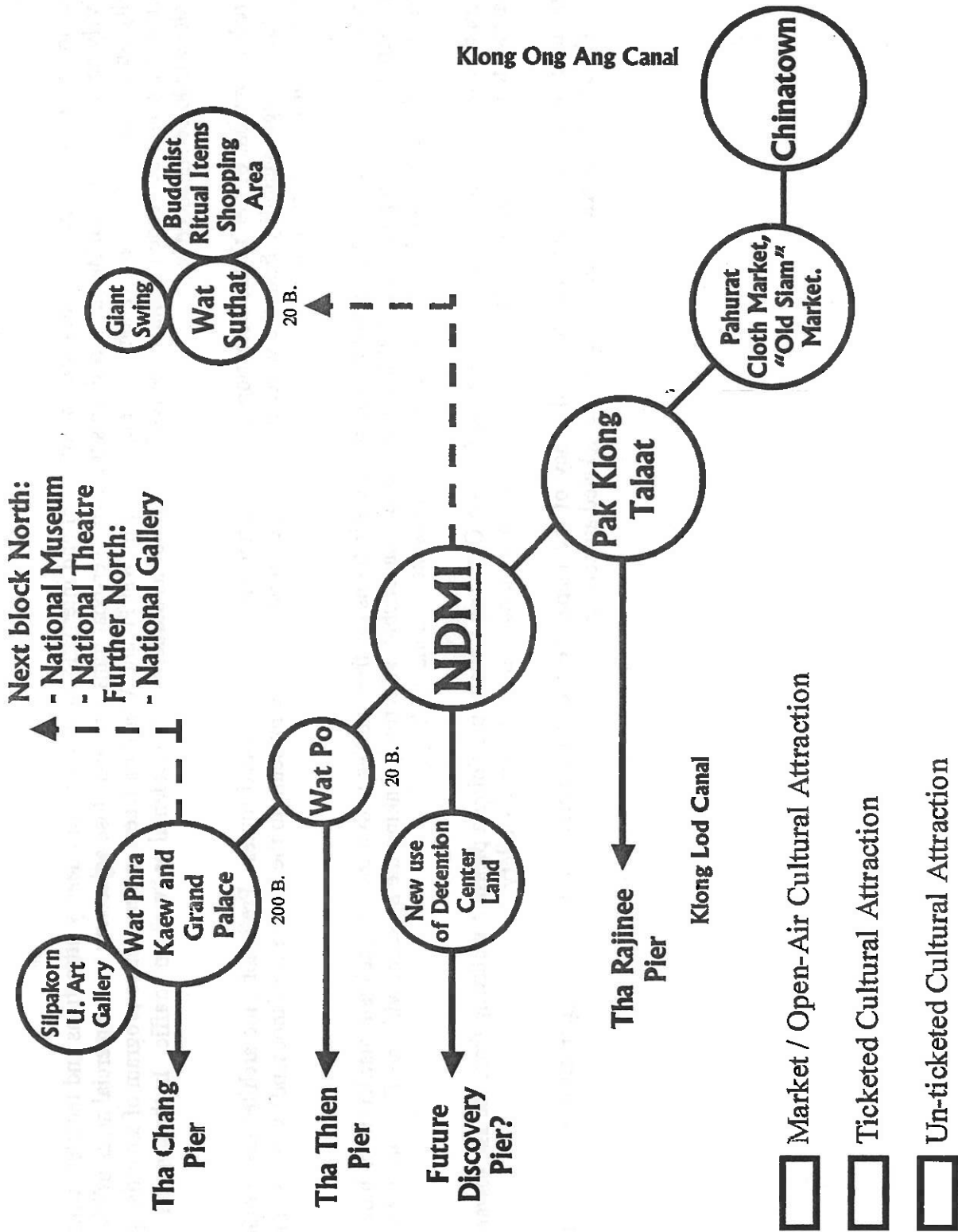
In some markets, significant numbers of incidental visitors can be drawn in by retail, food services, or even the architecture of the museum. There are some public services that the NDMI may offer (such as food, beverage and parking services) that are in acute demand in Rattanakosin, and will appeal to Thais irrespective of their other destinations on the island. If free admission is offered to Thai citizens (as recommended), and if the informal atmosphere of the NDMI (in contrast to the National Museum) is perceived by potential visitors, the synergy of the site (with adjacent attractions in the area) will increase for the domestic market over time. In other words, it will take time for Bangkokians to become aware that they could enjoy a new temporary exhibition on their way to or from the flower market or Wat Po, even though the museum may immediately attract high numbers as a destination attraction. While we noted before that incidental visitors with a positive first impression may return as destination visitors, we should also note that high levels of repeat visitation require that locals feel at ease with making an incidental return to see temporary exhibitions when they happen to be in the neighborhood (or to otherwise enjoy permanent exhibitions and on-site services again and again).

The latter pattern of behavior is familiar to some European cities, but is not part of the traditional culture of Thai museum attendance. The imposing and formal atmosphere of traditional museums tends to militate against casual visitation, and the often large and sprawling National Museums are very difficult to visit quickly. We would here re-state the importance of the use of the Detention Center land and the food and beverage services on site to "open up" the museum to the substantial pedestrian traffic that passes around it, and to encourage incidental attendance.

The selected location of the site is highly accessible to both Thai and international tourists from nearby attractions and temples, while remaining relatively accessible to local Bangkok residents through river-boat transport, and close adjacency to commercial areas of high pedestrian activity, such as the Pak Klong Talaat. Although close to Wat Po and Wat Phra Kaew, a very active program of advertising, signing, and promotion would be needed to make the NDMI “visible” as attraction for incidental or “walk-in” traffic. In the long-term, the value of the site would be enhanced by:

1. The redevelopment of the Youth Detention Center, linking the site to water-taxi routes. Preferably, the architecture should allow line-of-sight visibility from the waterfront, in order to promote the museum to the hundreds of thousands who use the river as a route of daily transport.
2. The extension of the existing program of restored historic trams (as free shuttles within the Rattanakosin district) to include a north-south route running past the NDMI along Thanon Sanamchai, effectively linking the museum with the Tha Sapan Phut express boat pier to the South, and running as far North as the National Gallery.
3. The continued restoration of the Klong Lod and Klong Ong Ang Canals, providing a pleasant walkway from the site toward Chinatown to the east, and also north as a route toward Wat Suthat and the National Gallery.

On the schematic map below, we show the close adjacency of the Department of Commerce site to other major attractions within walking distance. The admission price is noted below the ticketed attractions.



As the map indicates, the most significant and direct pedestrian linkages are to the Pak Klong Talaat market, and to Wat Po. The possibility of enhancing access to the NDMI through redevelopment of the detention center land would be of the utmost importance to securing the Bangkok residential market. Both Pak Klong Talaat and the Wat Phra Kaew have their own piers, connecting the district to the river and to the riverboats that provide daily transit for thousands of Bangkok residents. Pedestrian access to Pak Klong Talaat is direct, but the ability of visitors to reach the NDMI on foot is already being enhanced by the beautification of the Klad Lod Canal, which could become a separate (and more pleasant) pedestrian link (i.e., walking along the bankside). This would also improve the route to and from Wat Suthat, which is not remote, but currently difficult to reach on foot.

Of the two major roads passing the site, Thanon Maharat is more congested and also has more local color: the walk south along Thanon Maharat (from Tha Chang to the NDMI site) is shaded by trees that line the west side of the street, and is provided with cheery shops and street vendors at both the south and north end of the Grand Palace block. Nearest to the site, the shops and vendors are currently catering to students and visitors to Wat Po. It is Thanon Maharat that separates the NDMI site from the current Detention Center land, and *it is recommended that an architecturally unique pedestrian footbridge should link the two sites to increase both accessibility and visibility.* An attractive or interestingly engineered footbridge will alert all drivers proceeding down Thanon Maharat to the presence of the NDMI, just as visibility from the waterfront will alert all travellers on the Chao Phraya. As already mentioned above, the recommended shuttle bus (possibly part of the Rattanakosin district program of restored historic trams) should run on Thanon Sanamchai: this is a broader and less-congested road, which would link the NDMI with several of the future sites for redevelopment (such as the defense ministry and foreign affairs ministry) as well as increasing mutual-access of museum attractions on the island from as far north as the National Gallery, along a single (direct) north-south axis. Ideally, this shuttle could run as far south as the express boat stop at the Tha Sapan Phut pier; however, if the southern-most stop is immediately south of the NDMI (by Tha Rajinee and the Pak Klong Talaat) this will be sufficient.

In this section we have omitted the relationship of the site to the Student Group segment of the visitor market, for two reasons: (1) although there are several schools adjacent to the site, overall school group attendance will depend on the ability of museum staff to organize bussing of groups across a wider geographic area, rather than on walking distance, shuttle busses, or the other factors named above, and (2) we have reviewed strategic considerations on the student visitor market in a separate section, 3.1.2.

4.4 Revenue Projections

As all museum revenue is directly or indirectly driven by visitors to the site, the following projections are directly upon the preceding attendance projections. The assumptions stated in 5.3.5 also have a direct bearing on the projections to follow.

4.4.1 Sources of Revenue

The following sources of revenue are stipulated on the basis of our understanding of the functions and services offered by the NDMI; further opportunities to generate revenue may be discovered in the future, especially as partnerships with other institutions (both in the public and the private sector) begin to be explored. Generally, private sector participation (in revenue generation) occurs *after* a cultural attraction has proven its ability to generate a high level of visitor traffic. The potential for partnership with other academic and scholarly institutions in Bangkok is significant, and some of the ways in which this can directly generate revenue are explored in this chapter (e.g., rental of space to universities for seminars and special events); however, unique opportunities to mount revenue-generating programs in co-operation with other public institutions with compatible mandates (ranging from other museums to archaeological or ecological societies) are impossible to anticipate. Thus, the major categories of revenue-generating activities that we can forecast are as follows:

- Admissions (Ticket Revenue)
- Education & Outreach (including Museum training)
- Retail Sales
- Membership (including Volunteer Programs & Library Membership)
- Food Service Concession
- Facility Rentals
- Fundraising Events & Contributions
- Government Subsidy
- "Outdoor" Amenities (Including parking)

4.4.2 Admissions

As stated in our operating assumptions (section 5.3.5) the NDMI will extend free admission to all citizens of Thailand (including student groups), but will charge a fee for foreign tourists. This is parallel to the practice followed at The Grand Palace. Unlike The Grand Palace, the NDMI will begin offering a separate ticket for temporary exhibitions in phase 2 (i.e., after the new building opens, offering new and better facilities for special exhibitions). This is in accordance with the ticketing policy of many of the most successful museums the world over, and encourage repeat, paying visitors (such as expatriates living in Bangkok) to return to see new temporary exhibitions, without having to pay the full cost of the ticket; it also effectively increases the revenue generated by the majority of one-time international visitors. The 100 Baht admission fee proposed for (adult) tourists in Phase 1 is equivalent to the fee charged by several museums situated in restored historical buildings in Bangkok, such as the Siam Society Museum, and Jim Thompson House. As noted in 5.3.9, admission (for foreign tourists) to the nearby Grand Palace is 200 Baht, and the adjacent Wat Po charges 20 Baht. The "concessions" rated listed below includes the children of foreign tourists, and an assumed discount for the elderly.

As the tables below demonstrate, projections of ticket revenues are arrived at by the simple arithmetic of bringing together our stated assumptions and attendance projections from preceding sections. *In Phase 1, we have projected a fairly modest income from admissions of about 10 million Baht per annum, rising significantly to about 37 million in Phase 2.*

A full chart of attendance projections by phase is presented below (overleaf).

Admission Charges

	Phase 1	Phase 2
Thai citizens	Free	Free
Permanent Exhibitions		
Foreign Adult	100	100
Foreign Concessions	30	30
Special Exhibitions		
Foreign Adult	n/a	50
Foreign Concessions	n/a	15

Breakdown of Projected Attendance by Ticket Category

	Phase 1	Phase 2
Total Attendance	350,000	850,000
Full Price (Foreign Tourists)	85,750	238,000
Concessions (Foreign Tourists)	36,750	102,000
Thai attendance (excluding below)	70,000	255,000
Thai School Groups	157,500	255,000

Breakdown of Projected Attendance by Visitor Origin

	Phase 1	Phase 2
Total Attendance	350,000	850,000
Bangkok residents*	35,000	127,500
Student groups	157,500	255,000
Thai domestic tourists	35,000	127,500
Foreign visitors	122,500	340,000
Percentage Bangkok residents	10%	15%
Percentage Student Groups	45%	30%
Percentage Domestic Tourists	10%	15%
Percentage Foreign tourists	35%	40%

*Excluding student groups

Admissions (Ticket Revenue)

	Phase 1	Phase 2
Permanent Exhibitions		
Foreign Adult	8,575,000	23,800,000
Foreign Concessions	1,102,500	3,060,000
Special Exhibitions		
Foreign Adult	n/a	8,925,000
Foreign Concessions	n/a	1,147,500
Total	9,677,500	36,932,500

4.4.3 Education & Outreach

Although revenue generation will *not* be the primary purpose of education and outreach programs at the NDMI, certain types of income can be realized through educational programs, and striving to maximize these revenues provides an important stimulus for public institutions to offer the best programs possible, to reach the broadest possible audience, and increases the sustainability of government funding.

One important element of the NDMI's educational strategy will be the vitalization of Thailand's museum sector through the development of curriculum, training materials, and diploma/certificate granting courses in museum studies and related fields of expertise. These programs will not yield a profit; on the contrary, it is essential to their intended purposes that a significant percentage of applicants to the program be granted "scholarships" in the form of waived tuition. Many details of this program remain at an early stage of development, and neither the tuition nor the number of students has been precisely determined.

Based on our current understanding of the vision for the education and outreach program at the NDMI, we have supplied the following rough *per annum* figures for income from tuition (from the Museum Studies program) and occasional fees for specialized lectures or symposia. Ideally, while as many as 40% of students might have tuition waived as part of a scholarship program aimed at the improvement of the museum sector in Thailand, and tuition revenue will be nevertheless be equal to the annual operating costs of the program (note: this does not include the start-up cost of developing curriculum). **We have projected revenue from this source at 1,500,000 Baht.** Note that we have assumed that about one half of a full term of the Museum Studies Training Program will be carried out in 2006, i.e., partly in advance of the completion of the building, in accordance with indications from the NDMI that the program will need to be fully operational prior to the formal opening.

4.4.4 Retail Sales

As is outlined in section 5.3.5, in *phase 1* (i.e., while the museum is constrained to the Commerce Building) it is assumed that retail will consist of a small kiosk (with publications and merchandise specifically relevant to the NDMI) and a separate, larger shop will be operated by the Queen's foundation. Revenue from the Queen's Foundation shop *will not* accrue to the NDMI. In *Phase 2*, the NDMI will have a full-scale museum retail shop of 50 square meters in the New Building. Revenue from the latter shop and the kiosk in the Commerce Building *are* assumed to accrue to the NDMI.

Our estimates of retail sales take into account the size of the shops, the estimated number of visitors, and "benchmarks" from cultural attraction retail around the world. As one example of a prior benchmark, the 2002 Museum Store Association Retail Industry Report found that the art gallery retail industry average (in Western countries) for sales per visitor is \$3.42 (about \$122.5) with a median figure at \$2.14. The average net sales per square foot are \$458 (about \$17,862 per square foot) and the median is \$200.

Overall consumer spending is lower in Thailand than in the U.S., and western art galleries have a high-end retail skew (due to the particular market segment of adult gift purchases; a higher percentage of gifts purchased at a natural history museum or ethnography museum will be for children). At the low end of the spectrum of gifts offered by museum retail, the figures are particularly difficult to compare: a postcard at a Thai museum will cost \$5-\$8, whereas an American museum might charge \$0.75 or more (\$30+). Retail at the NDMI is likely to take advantage of three principle market segments:

- Children
 - Gifts and toys
 - Educational materials, including books and software
- Scholars
 - Publications
 - Prestige objects
- General Visitors
 - Items of all kinds branded or thematically related to exhibitions at the NDMI (including/especially temporary exhibitions)
 - Items promoting or linking to the NDMI's programs beyond the walls of the site: other heritage sites in Thailand, etc.
 - Memorabilia related to the brand or image of the NDMI itself

The cost of goods sold for museums (as reported in the 2002 Museum Retail Industry Report) range from 49% to 53% of their retail value, the range being partly explained by the quality of decision-making in selecting goods for sale.

Based on our knowledge and research, our estimates are that retail sales per visitor would be \$25 in phase 1 with an increase to \$45 in phase 2, to reflect expanded retail facilities and better market and product knowledge (of management) over time. While this may seem like a very low rate of spending per visitor, we should observe that this projection will entail that *retail income will exceed income from admissions (ticketing) in phase 2*, and further the sales generated per square meter are far above the averages quoted above. In other words, a very ambitious program of museum retail and a high intensity of visitor usage of the retail space available has been projected, counterbalanced by low prices (for standard gift items) relative to international standards.

Projected Retail Income	Phase 1	Phase 2
Assumptions		
Retail Space (sq. m.)	10	60
Projected Attendance	350,000	850,000
Avg. Spending	25	45
Income (Baht)	8,750,000	38,250,000
Sales per sq. m.	875,000	637,500

These figures exclude the Queen's Foundation retail, but include sales to non-visitors, and discounts to members. Cost of goods sold is included with the cost projections, while staffing and other overhead costs are included with those expense projections later in this chapter.

4.4.5 Memberships

The sale of memberships is a powerful tool to encourage pride and participation in a cultural institution; it is also one of the most effective means of cultivating and encouraging volunteerism. In this context, the significance of membership sales as a direct source of revenue is of tertiary importance; however, a dynamic and active membership program tends to indirectly encourage donations and other philanthropic support.

For the potential membership holder, the financial benefits to members are limited because there are no admission charges to the Museum; but it is assumed that members would receive discounts for certain program events, retail purchases, NDMI publications, and rentals of the facility. One of the primary benefits of membership is the convenience receiving regular announcements, invitations, and newsletters for openings, lectures, seminars and other events. The experience of museums generally is that the main motivation for membership is not the value received with unlimited free admission, gift shop and program discounts, but as an expression of support for the institution, and/or for respect for its research endeavors, or civic pride.

With the expansion of the NDMI Resources Center in phase 2, there will be additional applications for the membership program. While the intention of the NDMI is to make library collections/resources available to all, additional library privileges could be extended to members. It is unclear at this stage of planning precisely how the resource center will operate in terms of loans; however, it could be proposed that books (and other resources) could only be loaned or photocopied by members of the institution. In the detailed design phase, a members-only lounge or reading room could be adjacent to the resource center. These possibilities should be explored in subsequent stages of development.

At present, LORD has relatively little information on successful membership programs at museums within Thailand. The National Museum (Bangkok) has a highly motivated corps of volunteers at the helm of its membership program, and also in charge of its small public library; however, this is an unusual case in which the volunteers are entirely expatriate foreigners, and are largely organized around the necessity of offering tours in foreign languages. On the other end of the spectrum, the Siam Society is a membership-supported organization that includes a small museum, but is primarily defined by its scholarly activities, publications, library, and archaeological trips. The fees charged for membership at the Siam Society are 2,500 Baht *per annum* (with a reduced rate of only 500 Baht offered for students, including undergraduate university students) or 40,000 Baht for a lifetime membership. The Society reports that it has "close to 1,800" members (Source: *The Siam Society Fact Sheet*, a pamphlet printed by the Society). Although the NDMI may want to consider setting comparably high fees for membership in the long term, the Siam Society already has a highly developed library service, and produces a range respected periodicals, that merit such high annual fees, as well as a reputation built up over a century.

For planning purposes we have projected an initial membership of 200 persons in the first full year of operations. Based on Western precedents, *well-managed and promoted museum membership enrollment can only be expected to grow by 2% per annum in a normal year*; however, we have projected a 10% increase in 2008 (reflecting excitement over the new expansion, and rapidly rising awareness of the NDMI through its museum studies training program and coordinating role in relation to other cultural heritage projects), and a 50% leap for 2009, the first year in which the Phase 2 building will offer library services. The tables below show the revenues generated based on these assumptions and a moderate range of membership fees. December 2007 is omitted from consideration, as the museum is expected to open during the month of December 2007, and memberships are unlikely to generate significant revenue in such a short time-span (indeed, applications for new members may not be processed within the first few weeks of operations). These are conservative estimates, but reflect the reported weakness of museum patronage and the limited culture of repeat museum-visitation among Thais.

Membership Fees	Fee	Percentage
Volunteers	Free	10%
Annual Fee	1,000	70%
Student rate	200	20%

Projected Number of Members	2007	2008	2009
Volunteers	20	22	33
Full Membership	140	154	231
Student rate	40	44	66
Total	200	220	330
Revenue Generated	฿148,000	฿162,800	฿244,200

4.4.6 Food & Beverage Services

The experience of most museums and art galleries is that food service operation (even when concessioned out) is not significant source of revenue. Instead, the availability of food service is seen primarily as a service to visitors, with the bulk of the income going to the concessionaire. In the United States, data from the latest *AAM Financial Survey* indicates that food service income represents *less than 1%* of the total operating revenue of all museum types.

The amount of revenue generated for NDMI is subject to the terms negotiated with the concessionaire. Although the revenue generated for the concessionaire is ultimately driven by visitor traffic, it is assumed that the NDMI will (in effect) receive rent from the various restaurant service providers. A full review of issues and options in concessioning food services in downtown Bangkok is outside of the scope of this study, and outside of LORD's realm of expertise. For purposes of this report our estimates are based on an approximation of 5,000 Baht generated per net square meter, yielding about 1 million Baht per annum for the museum. This would seem to allow a sufficient margin for a high-quality concessionaire to profit, e.g., even working from the conservative assumption of an average per-visitor Food and Beverage purchase of 10 Baht, the NDMI should be able to present a potential visitor market for *at least* 8.5 million Baht of food and beverage purchases in the first full year of operations at the new building in Phase 2. There are only S&P and a few restaurants with air conditioning in Rattanakosin Island and this could make a high quality restaurant at the NDMI an attractor for additional attendance, raising the interest of the many locals on their way to and from the surrounding schools, temples, flower market, and so on.

4.4.7 Revenue from the Rental of Space

The downtown location of the NDMI (with adjacent, available parking) and its expected links to academic institutions will position it to realize significant revenue from the rental of facilities for conferences, seminars, and special events. We review the planned facilities that will be available for rental (when not in use for public programming) in the following table:

Phase 1: Commerce Building	
69 sq m. Event/Reception Room	
30 Seminar/Meeting Room (with wet bar)	
Phase 2: New Building	
Two 100 sq m seminar rooms	
Smart Multi-Purpose Lecture Theatre	
(300 seats, 300 square meters)	
480 sq. m. Conference & Training Center	

Given the above facilities, the ambience and location of the site, the NDMI would be an excellent place for evening rentals for corporate receptions, social functions and utilization of the theatre for such events as film presentations, ceremonial occasions, book launches, academic seminars, and so on. The rental cost should be competitive with the rates charged by downtown hotels for similar events. Bangkok is a city in which there are a great many conference and event facilities that will be in competition with the NDMI; excluding university campuses, the number of facilities available within Rattanakosin island is a relatively short list, but, even so, the NDMI will largely attract rental business through the prestige of the institution, the attractiveness of the site, and the fond familiarity that visitors and members will develop toward the museum over time. *All of these factors will develop over several years*, but there will be little public awareness of the NDMI as an option for evening rentals in its initial period of operations; and the only market segment that is likely to develop in the very short term are scholars and others who become familiar with the facilities directly through attending or participating in the NDMI's own program of lectures and events. Even more importantly, *rentals for special events such as weddings will be strongly discouraged by any ongoing construction on the site*; thus, the timetable for the completion of phase 2 and all parking facilities will be significant in relation to expected income from rentals.

With the exception of the Siam Society, the table below shows the rates charged for the rental of facilities at hotels in the Rattanakosin district. The Siam society is included for comparison, as the facilities it offers for rent are (similarly) on a property that combines restored historical structures and gardens with a modern, scholarly setting for seminars (etc.) or other special events including weddings.

	Seminar Room Rate	Maximum Seating	Catering Cost Per Person*
Siam Society	฿50,000	200	฿350
Price Palace Hotel	Free	1,000	฿420
Royal Hotel	฿1,000	80	฿240
Royal Princess Lan Luang	Free	120	฿600
New World Lodge Hotel	Free	120	฿120

*Where a range of catering rates was offered, a middle figure was chosen.

In evaluating the chart of examples above, we note that the costs associated with hiring out space (including the additional need for employing cleaning staff after the fact) are normally reported to be 50% of the gross fee charged. For the purposes of projecting revenues, we are assuming that catering will be arranged through the subcontracted concessionaire for the restaurant, or other third-party catering services, and will not directly generate revenue for the NDMI.

In the medium term, we believe the NDMI can achieve over 100 rentals per annum (i.e., about 2 each week), and achieving this level of rental service should not interfere with the public programs intended for the same space during open hours; however, we must project a very gradual curve toward this rate of rental, as the NDMI will begin as an unknown institution in an prestigious area of the city, but not one that has not been traditionally favored for such events. Even with active promotion of the rental facilities at the NDMI, potential clients will rarely rent a space they have not seen or visited, thus and the increasing rates of the rental over time will likely be reciprocal with growing membership, community awareness, and reputation among specialized segments of the market.

Assumed Rates for Rentals

	Rate
Commerce Bld.	
Seminar Room	5,000
Event/Reception Rm.	10,000
New Building	
Seminar Room 1	10,000
Seminar Room 2	10,000
Multi-Use Theatre	20,000
Complete Training Center	40,000

Revenue Generated by the Rental of Space

	2007	2008**	2009
Rentals	12	31	60
Revenue	80,000	290,000	620,000

*This chart shows a single rental simultaneously using multiple spaces as multiple entities

**The New Building will only be open for the final 4 months of 2008

The assumed rates for rentals stated above-left are based on our evaluation of the market, and should be regarded as variables for management to determine in response to the market in future stages of development. The conservative estimates for the number of rentals in the first year are based in part on the perceived disincentive to rentals that ongoing construction (and incomplete outdoor amenities) will entail, and the limited visibility of the site in advance of the clearing of the detention center grounds.

4.4.8 Fundraising and Contributions

Projecting income from fundraising is difficult, as the generosity of future patrons cannot be predicted, nor can the ability of an entirely new institution to garner that patronage be effectively anticipated. Although many studies exist on the relative fundraising ability of private and public cultural attractions, the most significant variable in determining success of fundraising in the cultural sector is *the allocation of sufficient staff for the task*, which we have provided for in the staffing and organization chapter of this report. Generally, government funded programs will have trouble attracting donations where there is the public perception of unlimited state support behind an institution.

There is a very positive example of ongoing fundraising for a partly publicly funded museum here in Bangkok, i.e., the Children's Discovery Museum (see section 5.1.3). The CDS has raised 3.5 million Baht *per annum* in direct fundraising events, and more than 11 million Baht in various corporate sponsorships (often with ties to promotions). To some extent, a children's museum is more easily "branded" for corporate support than a museum of natural history, ecology, ethnicity, and the other topics to be comprised in the NDMI. Conversely, the higher prestige accorded to research, publications, and maintaining a library in the areas of the NDMI's expertise will garner higher levels of philanthropic support from scholarly quarters. Already, the NDMI project has organized a significant segment of academic opinion in support of the project, and links with other cultural heritage institutions will (reciprocally) build awareness and philanthropic support over time. The facilities available for entertainment on the Commerce building site also auger well for fundraising events, and have already been successfully used for one significant function.

Generally, cultural institutions have more success in drawing support (including corporate donations tied to promotions) for new construction and the mounting of new special exhibitions, rather than ongoing operations costs. While ongoing construction is dissuasive to revenue from space rental (5.4.7) we are regarding the flurry of new activity and construction as a positive impact on fundraising in early years of operations. The extraordinary levels of generous support to-date cannot be assumed to be indicative of perpetual support for normal operating costs. At the inauguration ceremony for the NDMI (19th January, 2005), a total of 37 million baht was donated to the institution, with leading contributions from Thai Airways, E.G.A.T., Gulf Electric Co. Ltd, and Turn Around Co. Ltd.

The projected income from fundraising assumes both higher fundraising income and higher fundraising costs for 2008, with revenues dropping in the following year following the completion of the site. The redevelopment of subsequent parcels of land that may be entrusted to the NDMI (such as the youth detention center site) will provide new stimuli for fundraising, and give a new focus for public (and philanthropic) interest in the project.

Projected Fundraising Revenues	2006	2007	2008	2009
Fundraising events	2,880,000	3,000,000	4,000,000	2,520,000
Corporate Donations	12,500,000	12,500,000	14,000,000	10,000,000
Total	15,380,000	15,500,000	18,000,000	12,520,000
Fundraising Costs*	2,000,000	2,000,000	2,500,000	2,000,000
Net Revenue	\$13,380,000	\$13,500,000	\$15,500,000	\$10,520,000

*Costs associated with fundraising are discussed in section 6.5

4.4.9 Government Subsidy

The precise mode of Government subsidy to the project is still being determined.

At present, the National Government of Thailand has pledged between 3 to 3.7 billion Baht in support of the project. The schedule for transferring these funds is undetermined. For the purposes of this report, it is assumed that the funds will be allotted in equal, annual amounts from 2005 to the completion of the phase 2 building in 2008. It is assumed that the majority of these funds will be used for capital costs, a minority for initial operating costs, and the remainder will form a "foundation fund" of some kind for to support future acquisitions and operations of the NDMI. For the purposes of this report, the nature and scope of government subsidy after 2008 remains undetermined.

4.4.10 Outdoor Amenities

There will be a range of possible revenue-generating activities for the outdoor component of the NDMI site. To use a specific example: depending on the type of outdoor structure selected (see 5.3.2) live-music outdoor concerts (at day or at night) could be explored as an opportunity. While the precise nature of outdoor public programming remains undetermined, we may state the following as generalities:

- Significant revenue will be achieved from parking, as demand for both visitor and non-visitor parking will be high
- Weather-meliorating structures will make the NDMI site a more appealing location for many of the same types of outdoor events that are currently amassed on Sanam Luang in front of The Grand Palace (e.g., book fairs, craft fairs, daytime cultural celebrations).

With few exceptions, *museums tend to mount outdoor events in order to raise their own profile and encourage repeat museum attendance, rather than to directly earn revenues.* One of the most successful outdoor programs at a downtown museum is the *Centre Pompidou's* unticketed concerts and lectures. Despite the lack of a significant park or green space, the *Centre Pompidou* attracts literally millions of additional visitors (to its public "square") through lively (free) programming on the outdoor portion of its site.

"Impact" Exhibition Hall (Muang Thong Thani)

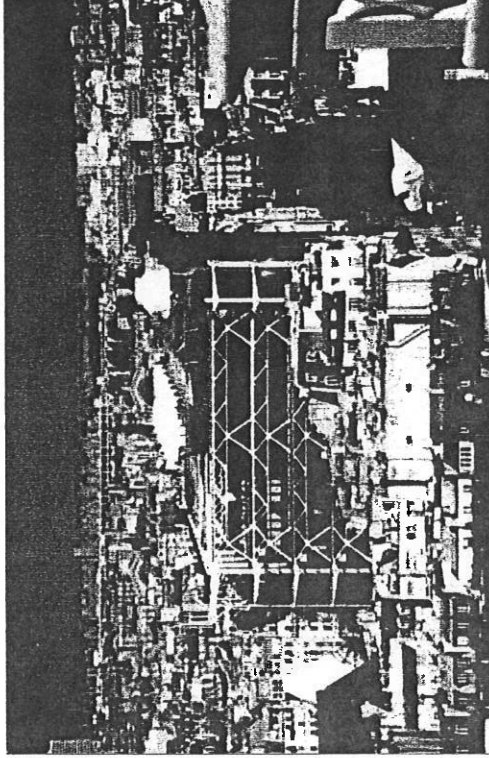
OTOP "Made in Thailand" Exhibition	
9 sq. m. booth	35,000
9 sq. m. corner booth	40,000
Total size of exhibition: over 20,000 sq m.	

"BITEC" Exhibition Hall

Bangkok Fashion Fair	
9 sq. m. booth	12,500
Booth with carpet & spotlight	21,000
Total size of exhibition: over 25,000 sq m.	
Public attendance (2004): 60,000	

Queen Sirikit Exhibition Hall

Amazing Thailand Fair	
Space for a 9 sq. m. booth	25,000
Space with a booth included	30,000
196 booths total	



Above: The Centre Pompidou and its environs, Paris

Conversely, Bangkok has a vibrant culture of public exhibitions with thematically linked rentals presented at booth, for which the exhibitor/retailer pays a set fee to the organizer.

Events of this kind currently mounted in Bangkok range from traditional handicrafts to contemporary arts, and both attract high attendance and generate significant revenues for all involved. The precedents of tens of thousands of visitors flocking to events such as the OTOP traditional product fair would indicate that similar (but smaller scale) events could be an attractive option for the NDMI, given its facilities, outdoor gardens, and its proposed co-operation with the Queen's Foundation (for traditional crafts). Were a single fair mounted annually at the NDMI, taking advantage of a period in which some of the indoor exhibition space was empty due to scheduled take-down of temporary exhibitions, significant revenue and public interest could be generated for the museum.

While questions as to the size and nature of the parking lot remain unresolved, we are using a figure of 1,200,000 Baht as a place-holder in our projections, representing a fully-functional and completed set of parking facilities in 2009. Pending further decisions on outdoor programming, we are projecting a total of 1,600,000 Baht of income from miscellaneous outdoor activities in 2009, including an annual indoor/outdoor fair of 80 booths (with free admission and revenue generated by charging a per-booth fee to exhibitors). The latter revenue projection is scaled back significantly while construction continues on-site in 2007 and 2008.

4.5 Operating Cost Projections

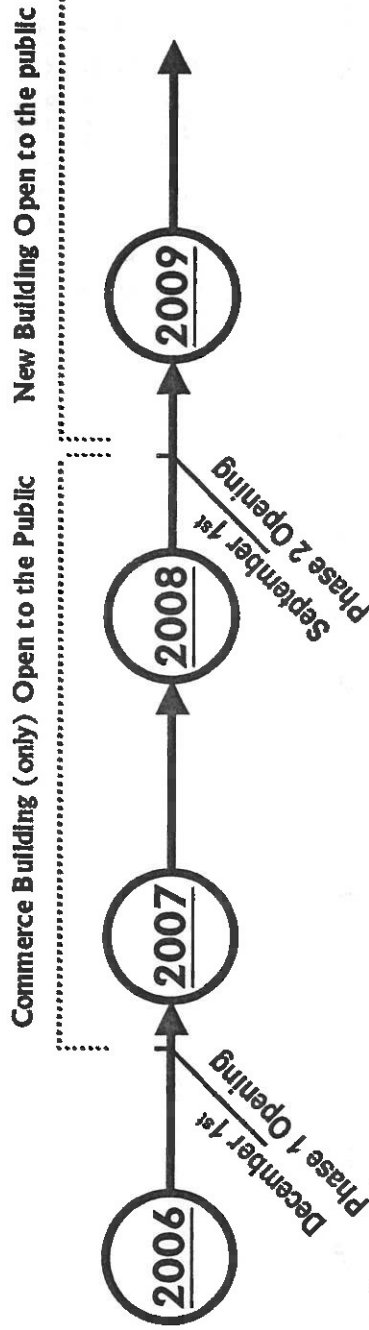
In this section we review operating costs under the following categories.

- Staff: Salaries & Benefits
- Staff training Costs
- Occupancy costs
- Exhibition Costs
- Programs & Special Events
- Education & Outreach
- General & Administrative
- Marketing & P.R.
- Cost of Retail Goods Sold
- Library/Resource Center Costs
- Outdoor Amenities

Note: All categories that are not explicitly addressed to staff costs exclude them (thus, e.g., the section on library costs is addressed to *non-staff operating costs for the resource center*, such as acquisitions).

4.5.1 Overview of Operating Costs and the Construction Schedule

By definition, the construction schedule of a new project will be subject to change. However, cost and revenue projections are very tightly linked to assumptions about the completion of buildings, and the dates on which various types of public services commence. Below, we present an overview of projected operating costs, and a graphical reminder of the assumed schedule to which many of the year-to-year changes in the figures are related.



Annual Operating Costs (Summary)	2005		2006		2007		2008		2009	
		%		%		%		%		%
Staff: Salaries & Benefits	\$21,200,000	52.1%	\$25,676,500	22.6%	\$34,218,000	27.1%	\$34,788,300	14.9%	\$35,928,900	14.3%
Staff training Costs	\$6,500,000	16.0%	\$5,000,000	4.4%	\$5,000,000	4.0%	\$5,000,000	2.1%	\$1,000,000	0.4%
Occupancy costs	\$0	0.0%	\$1,071,250	0.9%	\$12,855,000	10.2%	\$18,546,000	7.9%	\$29,926,000	11.9%
Exhibition Costs	\$0	0.0%	\$53,059,500	46.7%	\$40,950,000	32.4%	\$116,239,500	49.7%	\$140,985,000	56.2%
Programs & Special Events	\$0	0.0%	\$208,333	0.2%	\$2,500,000	2.0%	\$2,667,000	1.1%	\$3,000,000	1.2%
Education & Outreach	\$0	0.0%	\$4,500,000	4.0%	\$2,500,000	2.0%	\$2,500,000	1.1%	\$2,500,000	1.0%
General & Administrative	\$2,968,000	7.3%	\$3,594,710	3.2%	\$2,544,000	2.0%	\$3,081,180	1.3%	\$4,106,160	1.6%
Marketing & P.R.	\$10,000,000	24.6%	\$10,000,000	8.8%	\$10,000,000	7.9%	\$30,400,000	13.0%	\$10,000,000	4.0%
Cost of Retail Goods Sold	\$0	0.0%	\$365,000	0.3%	\$4,375,000	3.5%	\$9,292,000	4.0%	\$19,125,000	7.6%
Library	\$0	0.0%	\$10,000,000	8.8%	\$10,000,000	7.9%	\$10,000,000	4.3%	\$3,000,000	1.2%
Outdoor Amenities	\$0	0.0%	\$118,000	0.1%	\$1,400,000	1.1%	\$1,400,000	0.6%	\$1,400,000	0.6%
Total	\$40,668,000	100%	\$113,593,294	100%	\$126,342,000	100%	\$233,913,979	100%	\$250,971,060	100%

4.5.2 Breakdown of Operating Costs by Category

We will here briefly review the sources of costs, and note any special considerations in forecasting their changes over the schedule from 2006-2009. Note that 2009 is the *first full year of "normal" operations*, in that the site, and both principal buildings will be complete and open to the public for 12 months, with a full schedule of temporary exhibitions. It is also the first year in which the staff training budget and libraries acquisition budget are projected to be scaled back (after intensive spending in the opening years of operations), and so represents a more "normal" balance of operating costs in this respect as well.

Staff: Salaries and Benefits

Below we chart the projected number of positions against a range of salaries deemed appropriate to their responsibilities. Please refer to the chapter on staffing and organization for further information.

Description	Positions	Monthly Salary (range)	Annual Cost
Executive Director of NDMI	1	\$200,000	\$2,400,000
Director of Museum	1	\$150,000	\$1,800,000
Assistant to the director of NDMI	1	\$80,000	\$960,000
Assistant to the chairman	1	\$80,000	\$960,000
Academic Chief	1	\$60,000	\$720,000
Event chief	1	\$60,000	\$720,000
Administration Chief	1	\$60,000	\$720,000
Visitor Service Chief	1	\$60,000	\$720,000
Academic	4	\$60,000	\$720,000
Information Technology (IT)	3	\$40,000	\$480,000
Exhibit Designer	1	\$80,000	\$960,000
Exhibit Preparator	1	\$40,000	\$480,000
Project Management	3	\$40,000	\$480,000
Events/Activities	3	\$40,000	\$480,000

Training	2	\$40,000	\$80,000	\$1,200,000
Education Officer	4	\$40,000	\$80,000	\$2,400,000
Public Relation	3	\$40,000	\$60,000	\$1,800,000
Coordinator	2	\$20,000	\$30,000	\$600,000
Resource Center/Library	3	\$20,000	\$30,000	\$900,000
Administration	4	\$20,000	\$30,000	\$1,200,000
Retail Manager	1	\$20,000	\$30,000	\$300,000
Retail Clerk	1	\$8,000	\$15,000	\$138,000
Restaurant Mgr.	2	\$20,000	\$30,000	\$600,000
Front of House staff	5	\$8,000	\$15,000	\$690,000
Additional Phase 2 Front of House	5	\$8,000	\$15,000	\$690,000
Security, maintenance, other	40	\$8,000	\$15,000	\$5,520,000
Total	95			\$36,738,000

* Note the position of Restaurant Manager (2) could be changed is there service is contracted out.

Staff Training Costs

The staff training costs reflect two primary sources of expenditure: the stated intention to train most of the NDMI's own Museum Studies Program (see 4.4.3), and the expectation that current budgets for staff education, travel and training (including both visits to museums abroad and the occasional invitation of experts from abroad as consultants to the NDMI) will continue at a reduced rate until 2008, and then be further scaled back in 2009 (i.e., as the objectives of training are met for a higher and higher percentage of the staff, costs for new training decline).

Occupancy Costs

Occupancy costs are defined to include all costs, excluding salaries, associated with building repairs and maintenance, utilities, security systems and building insurance. In most museum-related attractions building occupancy costs range from \$4.00 to \$5.50 per gross square foot (i.e., roughly 1,600 to 2,800 Thai Baht per gross square meter) and vary by the extent of the environmental controls, weather conditions, the extent of public use and the condition of the building, with a new building requiring lower maintenance costs.

Occupancy costs for situating the NDMI in the Commerce Building have been determined at 12,885,000 Baht per annum. Although the new building in Phase two will have more public space, it will have lower per-area occupancy costs than the restored historic building, and is projected at slightly more than 17,000,000 Baht per annum. These costs will be susceptible to increase if there is regional to the volatility of the cost of electricity.

Exhibition Costs

Level of quality and applications of media are assumed to be comparable to exhibitions at major museums throughout Europe and North America. Per area costs are based on international industry standards for contemporary museum quality exhibitry, and LORD's prior experience with comparable museums in South-East Asia. There has been some allowance for lower local labor costs.

Soft costs for exhibition development (interpretative planning, research, design, scripting and project management) usually range from 22% to 30% of the total budget depending on the scale and complexity of the project.

Exhibition costs are calculated on the basis of a complex set of variables, including the duration, number, sequence, and interpretive strategy used for the exhibits. We have tried to represent projected schedule of exhibitions graphically on the chart below. This illustrates several factors that shape cost over the initial years of operation, perhaps the most critical being the relocation of permanent exhibits (and the opening of new temporary exhibits) in the new building in 2008. In addition to the schedule of temporary exhibitions depicted at the NDMI, the exhibition budget *includes funds to design, fabricate, mount and tour one 250 square meter traveling exhibition per annum*, as part of the program of bringing the NDMI message beyond its own walls, to other communities across Thailand (refer to the exhibition plan). Cost per area is projected to be higher for the temporary exhibition, due to the need for modular cases and exhibits. Some savings projected in 2008, as a portion of the new exhibits

A Hypothetical Schedule of Exhibitions at the NDMI

Opening Month (Dec. 2006) & First Year of Operations (2007)												
Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Second Year of Operations (2008)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Third Year of Operations (2009)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

Total Exhibition Space by Phase

	Phase 1	Phase 2
Permanent Ex.	480	1,000
Temp. Ex.	250	800
Travelling Ex.	250	250

Colour Code	Area	Size
	Commerce building: Permanent Ex.	480 sq m
	Commerce building: Temporary Ex.	250 sq m
	New building: Permanent Ex.	1000 sq m
	New building: Permanent Ex.	800 sq m
	Setup/takedown of exhibits	n/a
	Under construction/non-exhibition use	n/a

Programs and Special Events

These projections are based on the programs and events described in the exhibitions and programming chapter. There is a slight increase in the budget for phase 2, as programs expand to take advantage of the increased facilities and attendance projected.

Education and Outreach Costs

The non-staff cost of the education and outreach budget includes the production of educational materials intended for visitors and participants in classes/seminars, such as leaflets and publications (possibly short filmstrips, interactive CD-ROMs, etc.), but does not include major publications (such as technical, academic, or awards publications as part of the library's program, or in cooperation with outside publishers) or the production of new exhibition content. It also excludes printing of advertising/promotion materials, which are part of the marketing budget. This category includes costs associated with the museum studies training program described under 5.4.3, above.

General and Administrative Costs

General and administrative costs include office and related supplies, equipment, mailing, printing, telephone, travel, conferences, professional services (e.g. insurance and accounting fees), dues, subscriptions etc. These costs are closely related to staffing levels and usually range from 10-15% of total staffing costs. For purposes of these projections, we have estimated general and administrative costs at 14% of staffing costs in year 1, falling to 12% in subsequent years.

Marketing and Public Relations

Cultural attractions aim to spend about 5% of all other costs (comprising the total operating budget) on non-staff marketing costs; however, public institutions in Thailand can rarely allocate sufficient resources to marketing and promotion. In countries government regulations hold cultural advertising spending to the low end of the range. Institutions with free admission tend to be less dependent on marketing, due to the low threshold for drop-in visitors.

As part of the NDMI's bold vision to transform the way Thais think about Museums, a very significant budget allocation for marketing and promotions has been assigned to early years, including the "lead up" period prior to opening. This will have some reciprocal effect on donations, and will spur high attendance for the opening. Total spending on marketing and promotion is higher in 2008, to mark the opening of the phase 2 building. Note that in 2009, as all costs begin to return to "normal" levels after the opening, P.R. is 4.4% of the operating budget—in other words, the 10 million Baht allocation seems to be right on target by international standards.

Cost of Retail Goods Sold

Cost of goods sold for art galleries as reported in the 2002 Museum Retail Industry Report range from 49% to 53% of their retail value, the range being partly explained by the quality of decision-making in selecting goods for sale. The cost of retail goods has been calculated at 50% of projected sales.

Library/Resource Center Costs

Non-staff library costs will include acquisitions, publications, and any programming comprised under the resource center's own mandate.

4.6 Capital Cost Projections

As of the present stage of development, rough estimates for capital costs have been provided on the basis of a per-area calculation. In consultation with Khun Sunchai Keuysuvan from DSDI Architects, a 10,000 Baht per square meter cost, including construction and the installation of all utilities. Furnishing and refitting the historic building was also assigned a 10,000 Baht per square meter value. This provides us with a very rough figure to use for planning purposes, and will need to be refined at subsequent stages of research and development. This also seems to omit the various capital costs associated with unconfirmed options for the site, such as gardening, underground parking, and fabric structures. The table below simply represents the figures described with the further assumption that half of the capital cost for the new building will be spent in 2007, and the other half in 2008.

Capital Cost Estimate

	2006	2007	2008
Capital Costs	฿23,000,000	฿30,000,000	฿30,000,000

4.7 Summary Table of Projected Revenues and Operating Expenditures

The figure supplied for Government Subsidy is distributed very uncertainly by year; refer to section 5.4.9 for details.

	2005		2006		2007		2008		2009	
	\$	%	\$	%	\$	%	\$	%	\$	%
Annual Operating Costs (Summary)										
Staff: Salaries & Benefits	\$21,200,000	52.1%	\$25,676,500	22.6%	\$34,218,000	27.1%	\$34,788,300	14.9%	\$35,928,900	14.3%
Staff training Costs	\$6,500,000	16.0%	\$5,000,000	4.4%	\$5,000,000	4.0%	\$5,000,000	2.1%	\$1,000,000	0.4%
Occupancy costs	\$0	0.0%	\$1,071,250	0.9%	\$12,855,000	10.2%	\$18,546,000	7.9%	\$29,926,000	11.9%
Exhibition Costs	\$0	0.0%	\$53,059,500	46.7%	\$40,950,000	32.4%	\$116,239,500	49.7%	\$140,985,000	56.2%
Programs & Special Events	\$0	0.0%	\$208,333	0.2%	\$2,500,000	2.0%	\$2,667,000	1.1%	\$3,000,000	1.2%
Education & Outreach	\$0	0.0%	\$4,500,000	4.0%	\$2,500,000	2.0%	\$2,500,000	1.1%	\$2,500,000	1.0%
General & Administrative	\$2,998,000	7.3%	\$3,594,710	3.2%	\$2,544,000	2.0%	\$3,081,180	1.3%	\$4,106,160	1.6%
Marketing & P.R.	\$10,000,000	24.6%	\$10,000,000	8.8%	\$10,000,000	7.9%	\$30,400,000	13.0%	\$10,000,000	4.0%
Cost of Retail Goods Sold	\$0	0.0%	\$365,000	0.3%	\$4,375,000	3.5%	\$9,292,000	4.0%	\$19,125,000	7.6%
Library	\$0	0.0%	\$10,000,000	8.8%	\$10,000,000	7.9%	\$10,000,000	4.3%	\$3,000,000	1.2%
Outdoor Amenities	\$0	0.0%	\$118,000	0.1%	\$1,400,000	1.1%	\$1,400,000	0.6%	\$1,400,000	0.6%
Total	\$40,668,000	100%	\$113,593,294	100%	\$126,342,000	100%	\$233,913,979	100%	\$250,971,060	100%

Annual Revenues (Summary)

	2005		2006		2007		2008		2009	
	\$	%	\$	%	\$	%	\$	%	\$	%
Admissions (Ticket Revenue)	\$0	0.0%	\$887,104	0.1%	\$9,677,500	1.1%	\$18,762,500	2.0%	\$36,932,500	39.3%
Education/outreach	\$0	0.0%	\$750,000	0.1%	\$1,500,000	0.2%	\$1,500,000	0.2%	\$1,500,000	1.6%
Retail Sales	\$0	0.0%	\$802,083	0.1%	\$8,750,000	1.0%	\$18,583,333	2.0%	\$38,250,000	40.7%
Memberships	\$0	0.0%	\$0	0.0%	\$148,000	0.0%	\$162,800	0.0%	\$244,200	0.3%
Food Service Concession	\$0	0.0%	\$83,333	0.0%	\$1,000,000	0.1%	\$1,000,000	0.1%	\$1,000,000	1.1%
Facility Rentals	\$0	0.0%	\$0	0.0%	\$80,000	0.0%	\$290,000	0.0%	\$620,000	0.7%
Fundraising Events	\$37,000,000	4.1%	\$15,380,000	1.7%	\$15,500,000	1.7%	\$18,000,000	1.9%	\$12,520,000	13.3%
Government Subsidy	\$875,000,000	95.9%	\$875,000,000	98.0%	\$875,000,000	95.7%	\$875,000,000	93.5%	\$0	0.0%
Outdoor amenities, Incl. Parking	\$0	0.0%	\$235,000	0.0%	\$2,800,000	0.3%	\$2,800,000	0.3%	\$2,800,000	3.0%
Total	\$912,000,000	100%	\$893,137,521	100%	\$914,455,500	100%	\$936,098,633	100%	\$93,866,700	100%
Total Earned Revenue*	\$37,000,000		\$18,137,521		\$39,455,500		\$61,098,633		\$93,866,700	

*Total revenue excluding government Subsidy

5. Space and Facility Programme

5.1 Space Planning

5.1.1 Description of Museum Zones

The following table outlines and describes the required spaces for this facility. The spaces are organized by the 4 museum zones, and are defined according to whether the space accommodates collections or not, and whether the space normally is open to the public, or not.

- Zone A: Public Non-Collection Zone
- Zone B: Public Collection Zone
- Zone C: Non-Public Collection Zone
- Zone D: Non-Public Non-Collection Zone

Zones	Public	Non-Public
Non-Collections	A. Public Non-Collections	D. Non-Public Non-Collections
Collections	B. Public Collections	C. Non-Public Collections

Additional to this there may be other non-museum zones. This zoned approach to space planning forms the foundation for the Facility Strategy that in turn is the basis for architectural planning and the capital cost projections.

Zoning analysis is a valuable tool because cost per square meter varies directly for the different zones. For instance, Zone A and Zone B will often have a higher (and more costly) level of architectural finish, because these are the public spaces. Alternatively, Zone B and Zone C require climate control in keeping with the sensitivity of the collection-related exhibition elements.

One useful outcome of the Zoning Analysis, which can help in highlighting areas where shifts or reductions may be desirable, is a normative breakdown of museum space. It has been found that most museums and galleries have approximately 40% of their space invested in gallery or interpretive space. Approximately 20% of normative space is visitor space, 20% collections and exhibit support, and 20% Administrative and Operations.

Zone A

**Public Non-Collections
Visitor Services and Amenities, Public Program Space**

Public Non-Collection spaces include the lobbies, public retail and food services, washrooms, meeting and events space, performance space, and a range of education facilities. Both indoor and outdoor spaces require unobtrusive and flexible security systems to accommodate the variable hours that these spaces are open to the public and ensure the safety of the building as a whole and its occupants, including visitors, staff and performers, and collections.

This zone is typically the visitor's first experience of the building, and the public spaces help to orient the visitors to their performance, café, education and exhibition activities. In this zone visitors are present, but normally exhibitions are not. Lobby, shop and restrooms are the kind of spaces in this zone. Because it is open to the public, this zone requires a high level of finish on all surfaces – however since it does not normally hold collections-related exhibition elements, environmental controls do not need to be museum standards. However, areas that are assembly spaces – such as the multi-purpose function and event spaces and education rooms - will need specialized environmental conditions.

Typical Zone A Functional Areas include:

- Public Outdoor Space
- Lobby/Visitor Amenities
- Meetings/Hospitality
- Education Areas
- Food Services
- Retail

Zone B
Public Collections
Including Permanent and Temporary Exhibition Galleries

This Zone includes all designated gallery spaces, including both permanent collection and temporary exhibition galleries. This is the zone where visitors encounter the collections, as well as any art or artifacts borrowed from other organizations or institutions. This is the most costly part of the building, since this zone requires both high levels of finish to meet public expectations, and environmental controls and security for collections-related exhibition elements.

These galleries need good floor and ceiling loading, movable walls, power/communications grids and state-of-the-art lighting with no (or very tightly controlled and filtered) natural light. Finishes may vary from high quality art gallery surfaces to "black box" or neutral backgrounds. These spaces require high quality finishes, high levels of environmental control for the care of the collections and the comfort of the visitor, and technical fire and security systems for the protection of the collections (which will also be supported by human security).

Typical Zone B Functional Areas include:

- Permanent Collection Galleries
- Temporary and Changing Exhibition Galleries
- Other Galleries (special purpose galleries)

Zone C

Non-Public Collections

Including Collection Storage, Collection Handling, Collections Management Areas
(Very Limited or No Public Access)

The space in this Zone includes the essential "behind the scenes" requirements for collection handling and security, including shipping and receiving, permanent collection and temporary exhibition storage, exhibition equipment storage, and collections management workrooms. Collections are stored or worked on in this zone, but the public is not normally present. All the support areas for the temporary exhibition program - from the shipping-receiving area inward - are part of this zone.

Environmental controls and security need be to Museum standards for collections-related exhibition elements, but the level of finish can be to a functional level only, and need not meet public expectations. Doorway, corridor and room size, ceiling height and floor loading are demanding, but finishes need only be adequate for staff and for protection of collections.

The **Zone C Functional Areas** would normally include:

- Collection Storage
- Registration/Collections Management
- Collection Care and Preparation
- Collection Handling

Zone D
Non-Public Non-Collections
Including Administration, Operations, and Support Space
(Restricted Public Access and No Collections Present)

This Zone describes all staff and volunteer workspaces including: offices, office and technology communication centers, staff lounge and meeting rooms, as well as café/catering kitchen, and storage areas for programs, shop stock and special events (but not collection) storage. Support areas in this Zone are often located adjacent to the spaces they serve in other Zones: for example, the retail office and stock storage space may be physically located next to the shop.

This zone is broken down into two further sub-sections: Zone D1 Administrative Areas such as offices, administrative support and meeting rooms, and Zone D2 representing other support areas, shipping and receiving, non-collection storage, maintenance areas, and staff facilities. Zone D is frequently the lowest cost part of the building, since it requires neither a high level of environmental controls and security, nor the level of finish necessary to meet public expectations.

The Zone D Functional Areas might include:

- Offices
- Meeting Space
- Staff Amenities (including staff kitchens, washrooms, changing and locker rooms)
- Non-Collection Storage
- Workrooms/Control Rooms
- Food Services Support
- Retail Support
- Protective Services/Delivery/Trash including Loading Docks and Staff Entrance
- Theatre/AV Support

Zone G
Non-Public Non-Collections
Including Mechanical and Electrical Space

Non-Public Non-Collection area includes the mechanical and electrical spaces housing the building systems. These spaces are typically included within the grossing factor designation in a building program.

In general, these "back-of-house" building support spaces should be centrally located for service distribution, with direct barrier-free service access for maintenance and repair. Mechanical, electrical elevator and telecommunications rooms should be accessible by service personnel without them having to pass through any collection spaces. In a multi story building these spaces are often located in the basement level - in a single story building these spaces would typically located in a service area of the building.

The mechanical equipment rooms or other noise generating spaces should be acoustically separated from the public areas and should not be located adjacent to any spaces that have special acoustical requirements such as the exhibition galleries and theater or auditorium spaces, lecture rooms and education spaces, and meeting rooms.

Spaces that contain water services should be provided with floor drains and should NOT be located above or adjacent to any public or non-public spaces that contain collections. No liquid containing pipes other than sprinkler piping can be run through Collection spaces, and pipes in rooms or corridors (spaces) above or beside Collection spaces should be avoided if possible.

The Building Systems must operate 24 hours a day - 7 days a week - year round. Access to these spaces is controlled and restricted to authorized staff and service personnel.

This finishes in this non-public zone are at a service level and should be easy to maintain and clean.

Typical Zone G Functional Areas include:

- Boiler and HVAC Room (includes fans)
- Chiller Room (on a floating slab with acoustically isolated walls)
- Cooling Tower (outdoor space - visually enclosed or screened, but no roof)
- Sprinkler Room
- Water Meter Room

- Transformer Vault (outdoor – explosion proof)
- Main Electrical Room (with primary distribution gear)
- Main Telecommunications Room
- Server Room
- Distributed Electrical and Communication Closets
- Exhibition Gallery Lighting Control Room
- Exhibition Gallery Audio System Control Room
- Fire Response Room (typically at the Lobby)
- Elevator Machine Room
- Emergency Generator Room
- Oil Tank Room

The spaces in Zone G are additional to the building operations and support spaces that are already identified under Zone D, such as the BMS Control Room and Security Control Room.

The size, location and technical requirements for the mechanical and electrical spaces will be identified by the architectural and engineering team during the design process, in the next phases of the project. This will include identifying and sizing distribution systems, ducting and shafts, return and supply, and intake and exhaust systems.

5.2 Space List and Building Blocks

The following pages show the proposed Space List, identified by zone and by building, by zone. (a copy of the same spaces, identified by building / by zone, will be found in the appendix). Please note that the colours of the zones correspond to the above descriptions; the buildings are identified by the following descriptors:

- C Commerce Building – existing, to be renovated
- A “Annex” – Jantaburi Narunart Building
- N New construction (identified by area)

Two sets of space lists follow, corresponding to area totals for Phase 1 and Phase 2 respectively. Because some spaces in the Commerce Building will be re-allocated to new uses after the new building opens in Phase 2, it is necessary to provide separate tables, stipulating the uses per area, and totals.

In the charts following, we present:

- The Phase 1 Master Space List (organized by zone and building)
- The Phase 2 Master Space List (organized as above)
- Two charts comparing the space allocation totals for both phases (side by side)

Spaces that have had their function re-allocated in the transition from Phase 1 to Phase 2 are *highlighted in red ink.*

Phase 1 Master Space List

ZONE	Building	Floor	Space Name	Net Sq M	Phase	LORD Remarks
Prince Chantaburi Annex						
A	A	1F	Patio Café	35	1	Small indoor seating/ ordering counter/cashier, with additional outdoor patio seating TBD. Warming/Catering kitchen under zone D.
Building Subtotal:				35		
Commerce Building						
A	C	1F	Vestibule (Main entrance and stairwell 77 sm)	77	1	Vestibules required at each public entrance; separate group entrance TBD
A	C	1F	Entrance Hall (CB-corridor and center hall)	205	1	Entrance Hall providing access to Queen's Foundation and Event areas, and Ticketing/Information for NDMI.
A	C	1F	Event/Reception Room	69	1	Elegant event/reception space shared with the Queen's Foundation
A	C	1F	Lockers or Bag Check	10	1	Self-service lockers or manned bag check
A	C	1F	Visitor Services Storage	5	1	Strollers, wheelchairs, stanchions, brochures
A	C	1F	Ticket Offices (2 ticket windows)	10	1	Ticketing for Phase 1 and to allow for possible separate use of the commerce building in Phase 2
A	C	1F	Toilets	42	1	Existing Male and Female on each public floor
A	C	1F	QF Queen's Foundation Shop	80	1	High-end gift shop to be developed by the Queen's Foundation
A	C	1F	Wet Bar/Servery	5	1	Located to serve Event/Reception Room
A	C	1F	QF Friends & Patrons of the Queen's Foundation Room	40	1	Private Meeting/Dining/Lounge area adjacent to the QF Shop
A	C	2F	NDMI Retail Kiosk	30	1	Small sales kiosk for NDMI materials (additional space in Phase 1 TBD)
A	C	2F	Floor Lobby/Circulation (CB-corridor and center hall)	200	1	Entry Lobby from stairs at each floor (handicapped access TBD)
A	C	2F	Toilets	42	1	Existing Male and Female on each public floor
A	C	2F	Orientation Room/Audio Visual	70	1	Requires projection booth, casual bench seating for up to 60
A	C	3F	Floor Lobby/Circulation (CB-corridor and center hall)	137	1	Entry Lobby from stairs at each floor (handicapped access TBD)
A	C	3F	Toilets	42	1	Existing Male and Female on each public floor
A	C	3F	Seminar/Meeting Room	30	1	Set up as seated seminar room
Building Subtotal:				1,094		
Zone Subtotal:				1,094		

Zone B: Public Collections (Phase 1)					
Commerce Building					
B	C	1F	QF Exhibit space		
B	C	2F	CB Permanent Exhibits (2)	480	1
B	C	3F	CB Temporary Travelling Exhibit	250	1
B	C	3F	Resource Center On-Line Area	70	1
B	C	3F	Resource Center Search Room	70	1
B	C	3F	Resource Center Stacks	50	1
B	C	3F	Teacher's Resource Center	20	1
B	C	3F	Group Listening/ Viewing Rooms	15	1
B	C	3F	Resource Center Service Counter	20	1
Zone Subtotal:				1,055	
Zone Subtotal:				1,055	

Zone C: Non-Public Collections (Phase 1)					
Commerce Building					
C	C	1F	Transit/Crate Storage		
C	C	1F	Exhibit/Collection Receiving Area	40	1
C	C	3F	Research Room	20	1
C	C	3F	Resource Centre/Library Workroom	30	1
Zone Subtotal:				150	
Zone Subtotal:				150	

(Phase 1)

Zone D: Non-Public Non-Collections

Office Complex (Current Location)

D	O	2F	Exhibit/Curatorial Offices		50	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Education/Information Resources Offices		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	General Office		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Document Center/Mailroom		50	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Office Supplies/Stockroom		20	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Staff Conference Room		60	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Meeting Room, Staff (1)		20	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
				Zone Subtotal:	600		

Prince Chantaburi Annex

D	A	1F	Catering Kitchen/ Setup space		50	1	Full service Restaurant services and event support
D	A	1F	Maintenance Storage		25	1	Storage for building maintenance supplies and equipment
D	A	1F	Maintenance Workshop		35	1	Workshop for building maintenance functions (use may be reallocated in Phase 2)
D	A	1F	Cleaners' Storage/Duty Room		35	1	Storage for housekeeping supplies and equipment (use may be reallocated in Phase 2)
D	A	1F	Non-Collections Delivery		20	1	Indoor receiving area opening to covered ground-level dock serving 2 Loading Bays, Garbage Bin and Recycling Areas (use may be reallocated in Phase 2)
D	A	1F	Retail Storage and Workspace		20	1	Centralized retail services TBD
D	A	2F	Security Control Room		10	1	Centralized Security Control Room (use may be reallocated in Phase 2)
D	A	2F	Building Automation Control Room		10	1	Centralized BMS areas
D	A	2F	Retail & Publication Storage		40	1	Publications and publicity material for day to day
D	A	2F	Uniformed Staff Changing Rooms: Men/Women		35	1	Staff lockers, showers and toilets for security and cleaning/maintenance staff
D	A	2F	Docent Room		30	1	Lounge, coordinating office for docents, purse lockers
D	A	2F	Education Storage and Prep		30	1	On-site Education support
D	A	2F	Staff Lounge, kitchenette, toilets		40	1	Staff facilities for Admin, Education and Curatorial staff (use may be reallocated in Phase 2)
				Zone Subtotal:	380		

Commerce Building							
D	C	1F	Security Control Booth		4	1	Supervision of the Loading Bay (use may be reallocated in Phase 2)
D	C	1F	Building Automation Control Room		4	1	Centralized BMS areas
D	C	1F	Publication Storage		4	1	Publications and publicity material for day to day
D	C	1F	Retail Storage and Workspace		4	1	Centralized retail services TBD
D	C	1F	Catering Kitchen/ Setup space		8	1	Full service Restaurant services and event support
D	C	1F	Cleaners' Storage/Duty Room		4	1	Storage for housekeeping supplies and equipment
D	C	1F	QF Office and Storage		20	1	QF Retail Storage and Office for Retail On-Site Manager
D	C	1F	QF VIP/Staff toilets		15	1	Private toilet facilities for on-site staff and VIP visitors
D	C	2F	Projection Booth/AV Storage		5	1	Projection facilities for Orientation Theater
D	C	3F	Multimedia Studio		10	1	Creating, editing and remastering multimedia resources, including web management
Zone Subtotal:					78		
Zone Subtotal:					1,058		

Zone O: Outdoor Space							
O	O	G	Guard Post		0	1	External security post for 24-hour site protection and traffic control
O	O	G	VIP/Handicap Pickup/Drop-off		0	1	Serves for all car/taxi/VIP drop-off in Phase 1
O	O	G	Handicapped Parking		0	1	Phase 1
O	O	G	Staff and Volunteer Parking		0	1	Phase 1
O	O	G	CB Front Entrance Forecourt		0	1	Existing forecourt and landscaping to be restored
O	O	G	Car/Taxi Pickup/Drop-Off		0	1	Temporary; to be developed in Phase 2
O	O	G	Service Delivery Yard		0	1	Temporary Phase 1 location
O	O	G	Fire/Emergency Lane		0	1	Required by Code; TBD architects
Outdoor Space TBD:					0		(Phase 1)
Building Total:					3,357		

Phase 2 Master Space List

ZONE	Building	Floor	Space Name	Net Sq. M	Phase	LORD Remarks
Prince Chantaburi Annex						
A	A	1F	Patto Café	35	1	Small indoor seating/ ordering counter/cashier, with additional outdoor patio seating TBD. Warming/Catering kitchen under zone D.
Building Subtotal:				35		
Commerce Building						
A	C	1F	Vestibule (Main entrance and stairwell 77 sm)	77	1	Vestibules required at each public entrance; separate group entrance TBD
A	C	1F	Entrance Hall (CB-corridor and center hall)	205	1	Entrance Hall providing access to Queen's Foundation and Event areas, and Ticketing/Information for NDMI.
A	C	1F	Event/Reception Room	69	1	Elegant event/reception space shared with the Queen's Foundation
A	C	1F	Lockers or Bag Check	10	1	Self-service lockers or manned bag check
A	C	1F	Visitor Services Storage	5	1	Strollers, wheelchairs, stanchions, brochures
A	C	1F	Ticket Offices (2 ticket windows)	10	1	Ticketing for Phase 1 and to allow for possible separate use of the commerce building in Phase 2
A	C	1F	Toilets	42	1	Existing Male and Female on each public floor
A	C	1F	QF Queen's Foundation Shop	80	1	High-end gift shop to be developed by the Queen's Foundation
A	C	1F	Wet Bar/Servery	5	1	Located to serve Event/Reception Room
A	C	1F	QF Friends & Patrons of the Queen's Foundation Room	40	1	Private Meeting/Dining/Lounge area adjacent to the QF Shop
A	C	2F	Conference and Training Center	480	1	High quality space for conferences, meetings, Museology training, and hospitality, redeveloped from Permanent Exhibit space, with flexibly divided room areas
A	C	2F	NDMI Retail Kiosk	10	1	Small sales kiosk for NDMI materials (additional space in Phase 1 TBD)
A	C	2F	Floor Lobby/Circulation (CB-corridor and center hall)	200	1	Entry Lobby from stairs at each floor (handicapped access TBD)
A	C	2F	Toilets	42	1	Existing Male and Female on each public floor
A	C	2F	Orientation Room/Audio Visual	70	1	Requires projection booth, casual bench seating for up to 60
A	C	3F	Floor Lobby/Circulation (CB-corridor and center hall)	137	1	Entry Lobby from stairs at each floor (handicapped access TBD)
A	C	3F	Toilets	42	1	Existing Male and Female on each public floor
A	C	3F	Seminar/Meeting Room	30	1	Set up as seated seminar room
Building Subtotal:				1,554		

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New Addition													
A	N	1F	Vestibules (2) (new main entrance TBD)		40	2	Vestibules required at each public entrance; separate group entrance TBD						
A	N	1F	Entrance Hall		400	2	Entrance Hall providing access to NDMI visitor amenities, Galleries and Event areas, and Ticketing/Information for NDMI.						
A	N	1F	Group Entry Hall/ School Assembly/Orientation		200	2	Separate entrance to receive and orient school visits						
A	N	1F	Sick Bay		10	2	Adjacent to Group Entry Hall						
A	N	1F	Information Counter/ Tour Station		10	2	Information computer kiosks and counter for on-site and vicinity events and attractions						
A	N	1F	Lockers or Bag Check		30	2	Self-service lockers or manned bag check						
A	N	1F	Visitor Services Storage		20	2	Strollers, wheelchairs, stanchions, brochures						
A	N	1F	Schools Reception Counter		10	2	Check-in at the Group Entry Hall for school and tour groups						
A	N	1F	Schools Backpack Storage		40	2	Bins for backpacks etc for each school group						
A	N	1F	Ticket Offices, Central (up to 8 ticket windows)		25	2	Central ticketing for all on-site events and activities						
A	N	1F	NDMI Retail Shop		50	2	Full NDMI Gift Shop in Phase 2, specializing in "discovery" and "green" merchandise						
A	N	1F	Vending Nook		10	2	Located to serve school and tour groups						
A	N	1F	Restaurant/Cafe		200	2	Type of cafe or restaurant service TBD; additional outdoor/rooftop seating TBD. Restaurant/Catering kitchen under zone D.						
A	N	2F	Floor Lobby		50	2	Entry Lobby from stairs, escalators and elevators at each floor						
A	N	2F	Toilets		50	2	Male and Female on each public floor						
A	N	2F	Seminar/Meeting Rooms (2)		100	2	Set up as seated seminar rooms						
A	N	2F	Discovery Classrooms (4)		400	2	Set up as sturdy-finish exploration lab/studio spaces						
A	N	2F	Smart Multi-Purpose Lecture Theatre		300	2	Raked floor, fixed seating, auditorium stage, 300 seats, Projection Booth						
A	N	2F	Orientation Room/Audio Visual		70	2	Requires projection booth, casual bench seating for up to 60						
A	N	3F	Floor Lobby		50	2	Entry Lobby from stairs, escalators and elevators at each floor						
A	N	3F	Toilets		50	2	Male and Female on each public floor						
A	N	1F	Toilets		80	2	Male and Female on each public floor						
					Zone Subtotal:	2,195							
					Zone Subtotal:	3,784							

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(Phase 2)

Zone B: Public Collections									
Commerce Building									
B	C	1F	QF Exhibit space		80	1	Exhibits TBD the Queen's Foundation		
B	C	2F	CB Permanent Exhibits (2)		0	2	Redeveloped in Phase 2 as Zone A Conference/Training Space		
B	C	3F	Resource Center Gallery		100	2	Redeveloped in Phase 2 as expansion of the Resource Center, with small changing Archival Gallery space and expanded On-Line, Stacks, and Workroom space.		
B	C	3F	Resource Center On-Line Area		120	2	Multimedia on-line access computers for public use; sized for one full school class (30 students) expanded in Phase 2		
B	C	3F	Resource Center Stacks		150	2	Standard library shelving. Expanded in Phase 2		
B	C	3F	Teacher's Resource Center		20	1	Area for teachers to view, borrow or purchase education kits and resource materials		
B	C	3F	Group Listening/ Viewing Rooms		15	1	Intimate room for viewing film or video, listening to sound tapes etc, and for conducting interviews		
B	C	3F	Resource Center Service Counter		20	1	Assistance to Reference Center users, including help with on-line resources, printing and copying for fee, etc.		
				Zone Subtotal:	505				
New Addition									
B	N	1F	NDMI Temporary Exhibition Space		800	2	Exhibit area able to house travelling exhibits of international standard with full climate controls		
B	N	2F	NDMI Permanent Exhibition Space		400	2	Permanent Exhibits centering on the main theme areas - history, ethnology, natural science and ecology		
B	N	2F	NDMI Discovery Zones (2 x 50)		100	2	Discovery areas on each floor customized to amplify permanent exhibit content		
B	N	3F	NDMI Permanent Exhibition Space		400	2	Permanent Exhibits centering on the main theme areas - history, ethnology, natural science and ecology		
B	N	3F	NDMI Discovery Zones (2 x 50)		100	2	Discovery areas on each floor customized to amplify permanent exhibit content		
				Zone Subtotal:	1,800				
				Zone Subtotal:	2,305				

Zone C: Non-Public Collections (Phase 2)						
Commerce Building						
C	C	1F	Transit/Crate Storage	60	1	Environmentally controlled storage for travelling exhibition materials in transit (use may be reallocated in Phase 2)
C	C	1F	Exhibit/Collection Receiving Area	40	1	Secure, environmentally controlled space for receiving and unpacking shipments of exhibits and collections (use may be reallocated in Phase 2)
C	C	3F	Research Room	20	1	Scholarly research room for use by Curators and Scholars, with computers, bookshelves, print and file cabinets
C	C	3F	Resource Centre/Library Workroom	30	1	Receiving, inventory and cataloguing, storage, digitizing
C	C	3F	Expanded Resource Centre/Library Workroom	100	1	Redeveloped in Phase 2 from Temporary Exhibition Gallery, inventory and cataloguing, storage, digitizing
Zone Subtotal:				250		
New Addition						
C	N	1F	Collections Storage	60	2	Environmentally controlled storage for limited artifact and archival collections
C	N	1F	Transit/Crate Storage	80	2	Environmentally controlled storage for travelling exhibition materials in transit
C	N	1F	Collections Workroom	40	2	Immediately adjacent to Collections Storage, for cataloguing, photography, digitizing
C	N	1F	Exhibit/Collections Props	60	2	Storage for exhibit furniture such as cases, panels, movable walls, etc.
C	N	1F	Exhibit/Collections Supplies	25	2	Clean storage for collections packing and storage supplies
C	N	1F	Exhibit/Collections Inspection Room (Packing/Unpacking)	40	2	Secure, environmentally controlled space for packing and unpacking exhibits and collections
C	N	1F	Exhibit/Collection Receiving Area	60	2	Secure, environmentally controlled space for receiving shipments of exhibits and collections
C	N	1F	Exhibit/Collections Isolation Storage	10	2	Secure, environmentally controlled space for pending storage and treatment of infestations
C	N	1F	Exhibit/Collections Loading Bay	0	2	External space: Requires 1 dedicated collections loading bays for tractor-trailer access @ 250 sm
C	N	3F	Research Room	20	2	Scholarly research room for use by Curators and Scholars, with computers, bookshelves, print and file cabinets
Zone Subtotal:				395		
Zone Subtotal:				645		

Zone D: Non-Public Non-Collections Office Complex (Current Location)							
D	O	2F	Exhibit/Curatorial Offices		50	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Education/Information Resources Offices		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	General Office		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Document Center/Mailroom		50	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Office Supplies/Stockroom		20	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Staff Conference Room		60	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	O	2F	Meeting Room, Staff (1)		20	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
				Zone Subtotal:	600		

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Prince Chantaburi Annex							
D	A	1F	Security Control Room		10	1	Centralized Security Control Room (use may be reallocated in Phase 2)
D	A	1F	Building Automation Control Room		10	1	Centralized BMS areas
D	A	1F	Publication Storage		4	1	Publications and publicity material for day to day
D	A	1F	Retail Storage and Workspace		50	1	Centralized retail services TBD
D	A	1F	Catering Kitchen/ Setup space		50	1	Full service Restaurant services and event support
D	A	1F	Maintenance Storage		40	1	Storage for building maintenance supplies and equipment
D	A	1F	Maintenance Workshop		40	1	Workshop for building maintenance functions (use may be reallocated in Phase 2)
D	A	1F	Cleaners' Storage/Duty Room		40	1	Storage for housekeeping supplies and equipment (use may be reallocated in Phase 2)
D	A	1F	Uniformed Staff Changing Rooms: Men/Women		40	1	Staff lockers, showers and toilets for security and cleaning/maintenance staff
D	A	1F	Non-Collections Delivery		20	1	Dock serving 2 Loading Bays, Garbage Bin and Recycling Areas (use may be reallocated in Phase 2)
D	A	2F	Exhibit/Curatorial Offices		50	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	A	2F	Education/Information Resources Offices		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	A	2F	General Office		200	1	Civil Service office standards to be confirmed (use may be reallocated in Phase 2)
D	A	2F	Document Center/Mailroom		50	1	(use may be reallocated in Phase 2)
D	A	2F	Office Supplies/Stockroom		20	1	(use may be reallocated in Phase 2)
D	A	2F	Staff Conference Room		60	1	(use may be reallocated in Phase 2)
D	A	2F	Meeting Room, Staff (1)		20	1	0
D	A	2F	Docent Room		30	1	Lounge, coordinating office for docents, purse lockers
D	A	2F	Education Storage and Prep		20	1	On-site Education support
D	A	2F	Staff Lounge, kitchennette, toilets		50	1	Staff facilities for Admin, Education and Curatorial staff (use may be reallocated in Phase 2)
				Zone Subtotal:	1,004		

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Commerce Building									
D	C	1F	Security Control Booth			4	1		Supervision of the Loading Bay (use may be reallocated in Phase 2)
D	C	1F	Building Automation Control Room			4	1		Centralized BMS areas
D	C	1F	Publication Storage			4	1		Publications and publicity material for day to day
D	C	1F	Retail Storage and Workspace			4	1		Centralized retail services TBD
D	C	1F	Catering Kitchen/ Setup space			8	1		Full service Restaurant services and event support
D	C	1F	Cleaners' Storage/Duty Room			4	1		Storage for housekeeping supplies and equipment
D	C	1F	QF Office and Storage			20	1		QF Retail Storage and Office for Retail On-Site Manager
D	C	1F	QF VIP/Staff toilets			15	1		Private toilet facilities for on-site staff and VIP visitors
D	C	2F	Projection Booth/AV Storage			5	1		Projection facilities for Orientation Theater
D	C	2F	Catering Setup space			40	2		Catering setup (non-cooking) area to support the 2F Hospitality Suite
D	C	3F	Multimedia Studio			10	1		Creating, editing and remastering multimedia resources, including web management
				Zone Subtotal:		118			

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New Addition									
D	N	1F	Security Control Room			15	2	2	Centralized Security Control Room and Booth adjacent to Loading Bay
D	N	1F	Building Automation Control Room			10	2	2	Centralized BMS areas
D	N	1F	Retail Storage and Workspace			50	2	2	Centralized retail services TBD
D	N	1F	Catering Kitchen/ Setup space			50	2	2	Full service Restaurant services and event support
D	N	1F	Maintenance Storage			20	2	2	Storage for building maintenance supplies and equipment
D	N	1F	Maintenance Workshop			10	2	2	Workshop for building maintenance functions
D	N	1F	Cleaners' Storage/Duty Room			10	2	2	Storage for housekeeping supplies and equipment
D	N	1F	Uniformed Staff Changing Rooms: Men/Women			40	2	2	Staff lockers, showers and toilets for security and cleaning/maintenance staff
D	N	1F	Non-Collections Delivery			20	2	2	Dock serving 2 Loading Bays, Garbage Bin and Recycling Areas
D	N	2F	Projection Booth/AV Storage			10	2	2	Projection facilities for Orientation Theater
D	N	2F	Projection Booth/AV Storage			20	2	2	Projection Facilities and Storage for Smart Auditorium
D	N	2F	Cleaners' Storage/Duty Room			10	2	2	Storage for housekeeping supplies and equipment
D	N	2F	Education Storage and Prep			40	2	2	On-site Education support
D	N	3F	Publication Storage			5	2	2	Publications and publicity material for day to day
D	N	3F	Exhibit/Curatorial Offices			75	2	2	Civil Service office standards to be confirmed
D	N	3F	Education/Information Resources Offices			200	2	2	Civil Service office standards to be confirmed
D	N	3F	General Office			200	2	2	Civil Service office standards to be confirmed
D	N	3F	Document Center/Mailroom			50	2	2	0
D	N	3F	Office Supplies/Stockroom			20	2	2	0
D	N	3F	Staff Conference Room			60	2	2	0
D	N	3F	Meeting Room, Staff (1)			20	2	2	0
D	N	3F	Docent Room			30	2	2	Lounge, coordinating office for docents, purse lockers (use may be reallocated in Phase 2)
D	N	3F	Multimedia Studio			250	2	2	Expanded multimedia broadcast and web management facilities
D	N	3F	Cleaners' Storage/Duty Room			10	2	2	Storage for housekeeping supplies and equipment
D	N	3F	Staff Lounge, kichenette, toilets			50	2	2	Staff facilities for Admin, Education and Curatorial staff
						Zone Subtotal:	1,275		
						Zone Subtotal:	2,397		

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Zone O: Outdoor Space									
0	0	G	Guard Post			0	1	1	External security post for 24-hour site protection and traffic control
0	0	G	Car/Taxi Pickup/Drop-Off			0	1	1	Temporary; to be developed in Phase 2
0	0	G	VP/Handicap Pickup/Drop-off			0	1	1	Serves for all car/taxi/VP drop-off in Phase 1
0	0	G	Handicapped Parking			0	1	1	Phase 1
0	0	G	Staff and Volunteer Parking			0	1	1	Phase 1
0	0	G	CB Front Entrance Forecourt			0	1	1	Existing forecourt and landscaping to be restored
0	0	G	Service Delivery Yard			0	1	1	Temporary Phase 1 location
0	0	G	Fire/Emergency Lane			0	1	1	Required by Code; TBD architects
0	0	B1	Underground Public Parking			0	2	2	To be developed in Phase 2
0	0	B2	Underground Public Parking			0	2	2	To be developed in Phase 2
0	0	G	Pedestrian Walkways			0	2	2	Paved pedestrian walkways with sun shading/ landscaping and night lighting
0	0	G	Car/Taxi Pickup/Drop-Off			0	2	2	Temporary; to be developed in Phase 2
0	0	G	Bus Pickup/Drop-Off & Parking			0	2	2	To be developed in Phase 2
0	0	G	New Addition Front Entrance Forecourt			0	2	2	New forecourt and garden court to be developed for New Addition
0	0	G	Service Delivery Yard			0	2	2	Final Phase 2 locations TBD
0	0	G	Fire/Emergency Lane			0	2	2	Required by Code; TBD architects
0	0	4F	Roof Garden/ Green Demo Space			1500	2	2	New Addition rooftop to be developed as garden and outdoor interactive (green building/ecology) demonstration space, with canopies or pergolas, potential for restaurant/event space
				Outdoor Space TBD:		1,500			
				Building Total:		10,631			

Comparative Summary, Phase 1 & Phase 2 Space List Totals by Zone

PHASE 1 SUMMARY		
Zone A	NSM	%
Commerce Building	1,094	
Annex	35	
Zone A Total:	1,094	33%
ZONE B		
Commerce Building	1,055	
Annex	0	
Zone B Total:	1,055	31%
ZONE C		
Commerce Building	150	
Annex	0	
Zone C Total:	150	4%
ZONE D		
Office Complex (Current Location)	600	
Commerce Building	78	
Annex	380	
Zone D Total:	1,058	32%
ZONE O		
Zone O	0	0%
Zone O Total:	0	0%
Total Net Square Meters	3,357	100%
Grossing Factor	1,400	
Total Gross Square Meters	4,699	140%

PHASE 2 SUMMARY		
Zone A	NSM	%
Commerce Building	1,554	
Annex	35	
New Addition	2,195	
Zone A Total:	3,784	36%
ZONE B		
Commerce Building	505	
Annex	0	
New Addition	1,800	
Zone B Total:	2,305	22%
ZONE C		
Commerce Building	250	
Annex	0	
New Addition	395	
Zone C Total:	645	6%
ZONE D		
Commerce Building	118	
Office Complex (Current Location)	600	
Annex	1,004	
New Addition	1,275	
Zone D Total:	2,397	23%
Zone O		
Zone O	1,500	14%
Zone O Total:	1,500	14%
Total Net Square Meters	10,631	100%
Grossing Factor	1,400	
Total Gross Square Meters	14,883	140%

5.3 Phasing the Project

5.3.1 Phase One: Demolition and Renovation

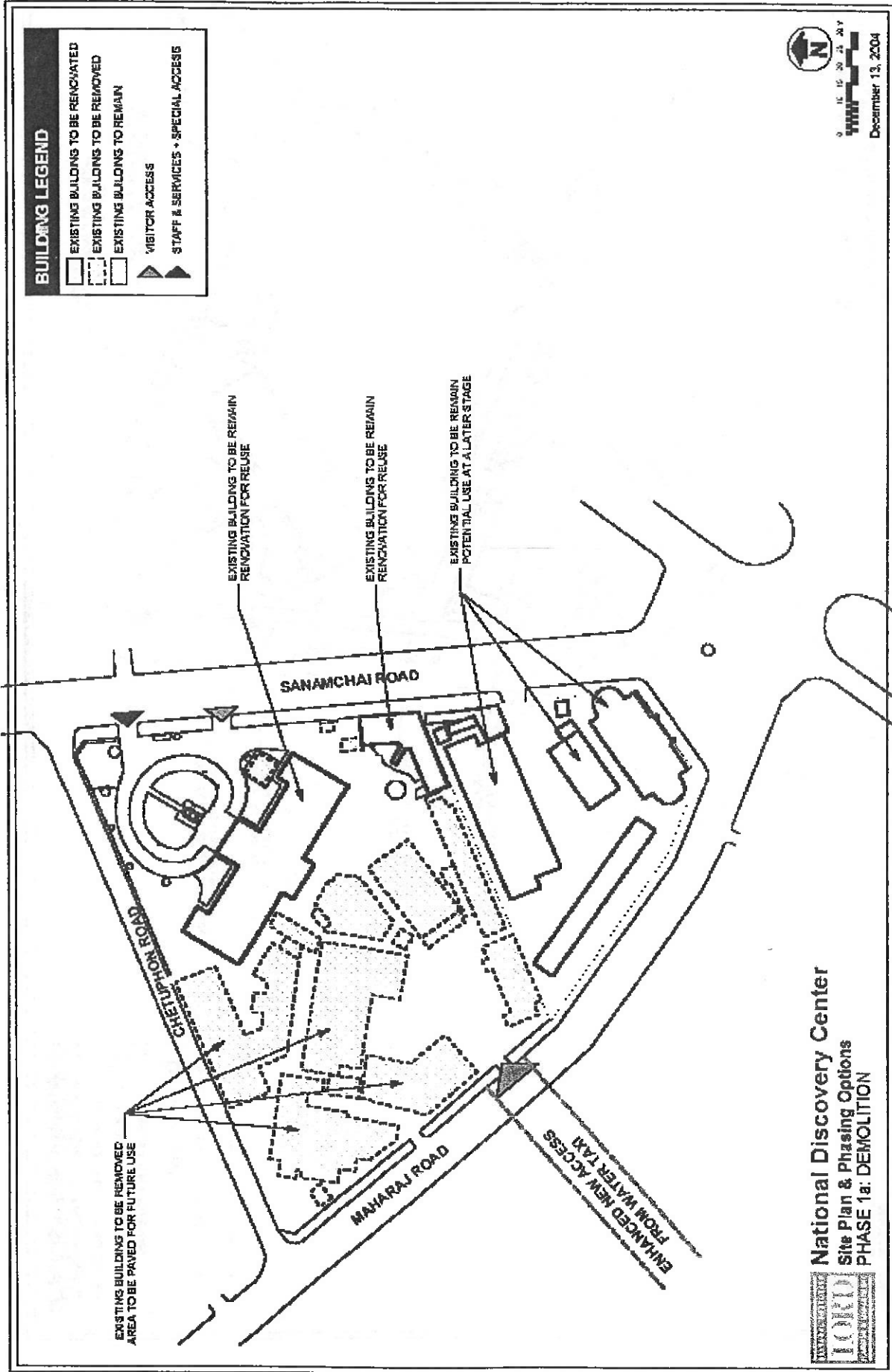
The renovation of the Commerce Building and the Jantaburi Narunart Building will be carried out in the first of two phases: both buildings will be brought up to modern standards (as applicable, based on the Space List requirements). Concurrently, the remainder of the buildings on the site proper (see Key Plan in previous section) will be demolished, and the area will be paved and prepared for visitor and staff parking, bus parking, and gathering space.

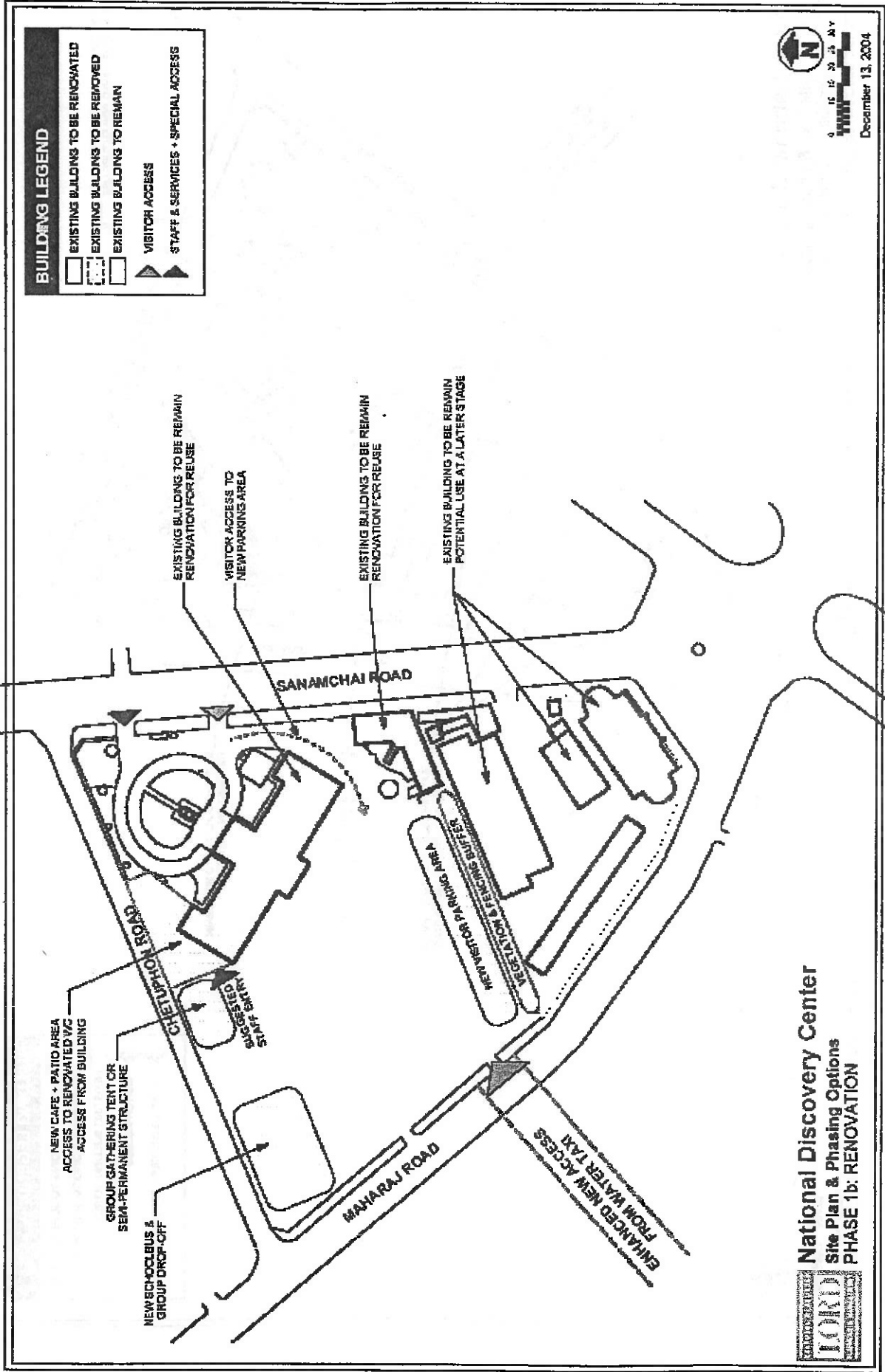
As part of this phase, the buffer area between the zone proper and the adjacent property to the south will be have to be built up (combination of thick vegetation and fencing) to delimit it from the Police property.

The front of the Commerce Building will be developed to allow for visitor vehicular access to connect to the new parking spaces provided at the rear of the building. The north corner of the building against Chetuphon Road will be developed into an outdoor café area, partially covered, with access to the building's existing WC facilities; a catering kitchen will be located within this section of the ground floor of the building, or within a new small structure temporarily constructed for this phase. Alternatively, the vehicular access to the parking could be located at the north side of the Commerce Building, in which case the food service would be located between the Jantaburi Narunart Building and the Commerce Building.

Loading of art and materials will be made at the rear of the building.

Please refer to the following two pages outlining the demolition and renovation to be carried out on the property for Phase One.

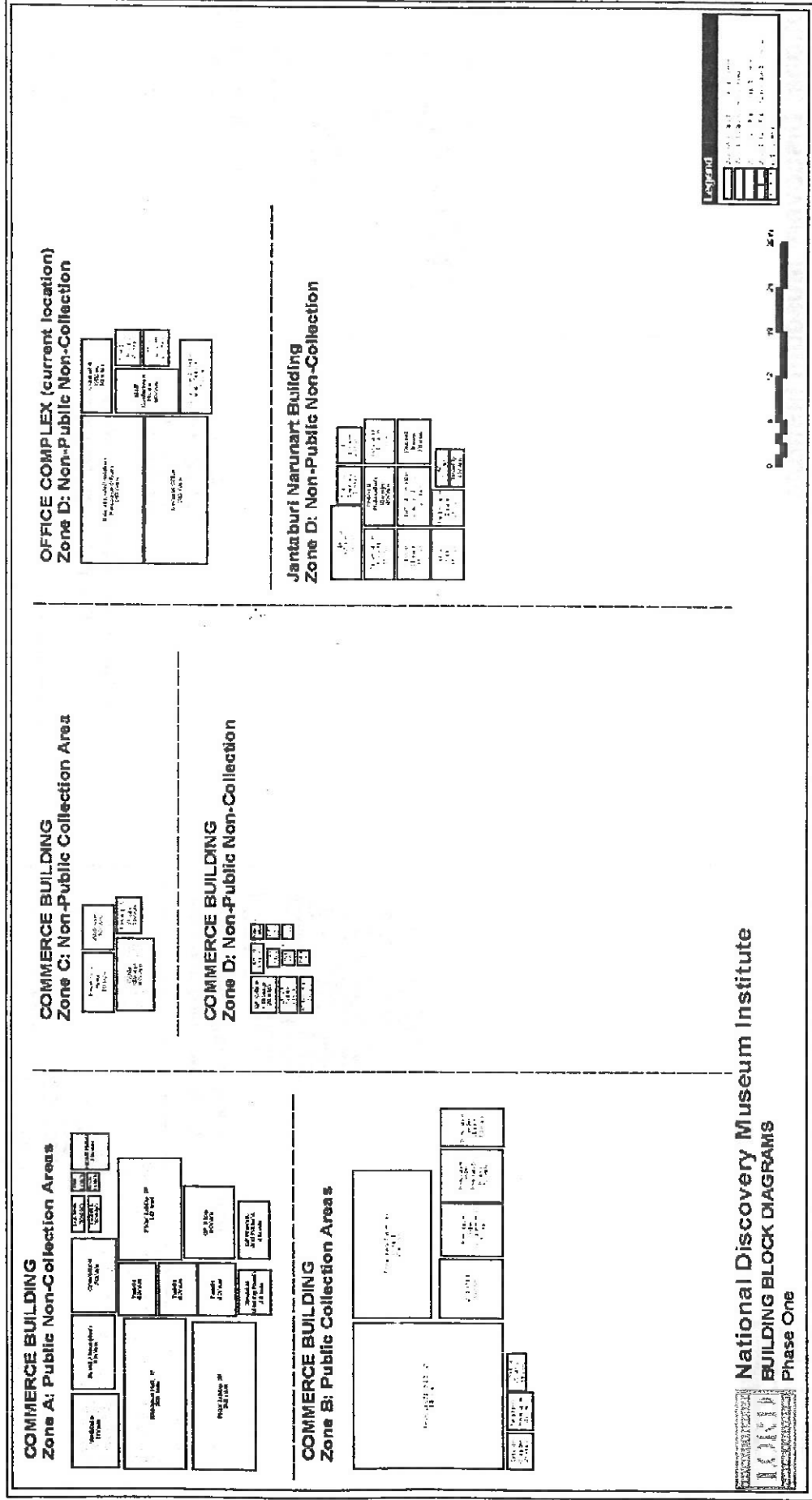




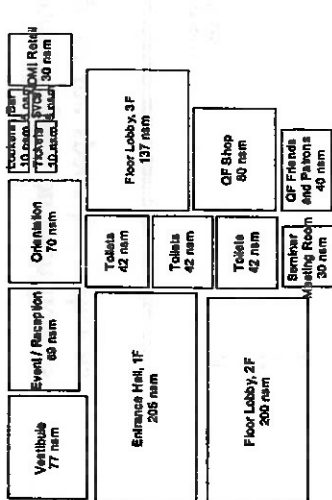
LORD National Discovery Center
 Site Plan & Phasing Options
 PHASE 1b: RENOVATION

5.3.2 Space Allocation in Phase 1

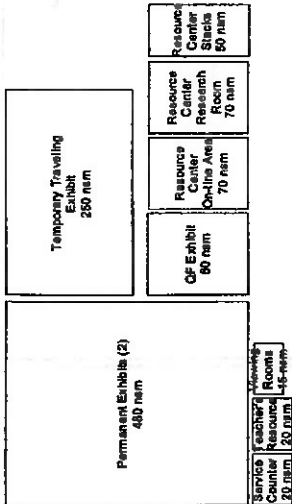
The following diagrams illustrate how the space program could be realized in the existing buildings. The organization of space on each floor is provided to demonstrate how the program could be accommodated, but is not to be interpreted as a firm design of the space but rather as stimulus for discussion.



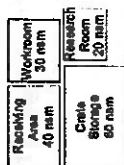
**COMMERCE BUILDING
Zone A: Public Non-Collection Areas**



**COMMERCE BUILDING
Zone B: Public Collection Areas**



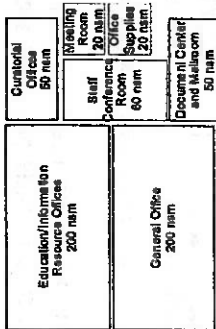
**COMMERCE BUILDING
Zone C: Non-Public Collection Area**



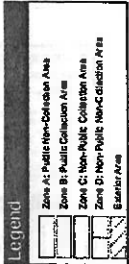
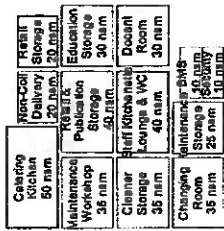
**COMMERCE BUILDING
Zone D: Non-Public Non-Collection**

- Security 4 nam
- Storage 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
- AV Shop 4 nam
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- AV Shop 4 nam

**OFFICE COMPLEX (current location)
Zone D: Non-Public Non-Collection**

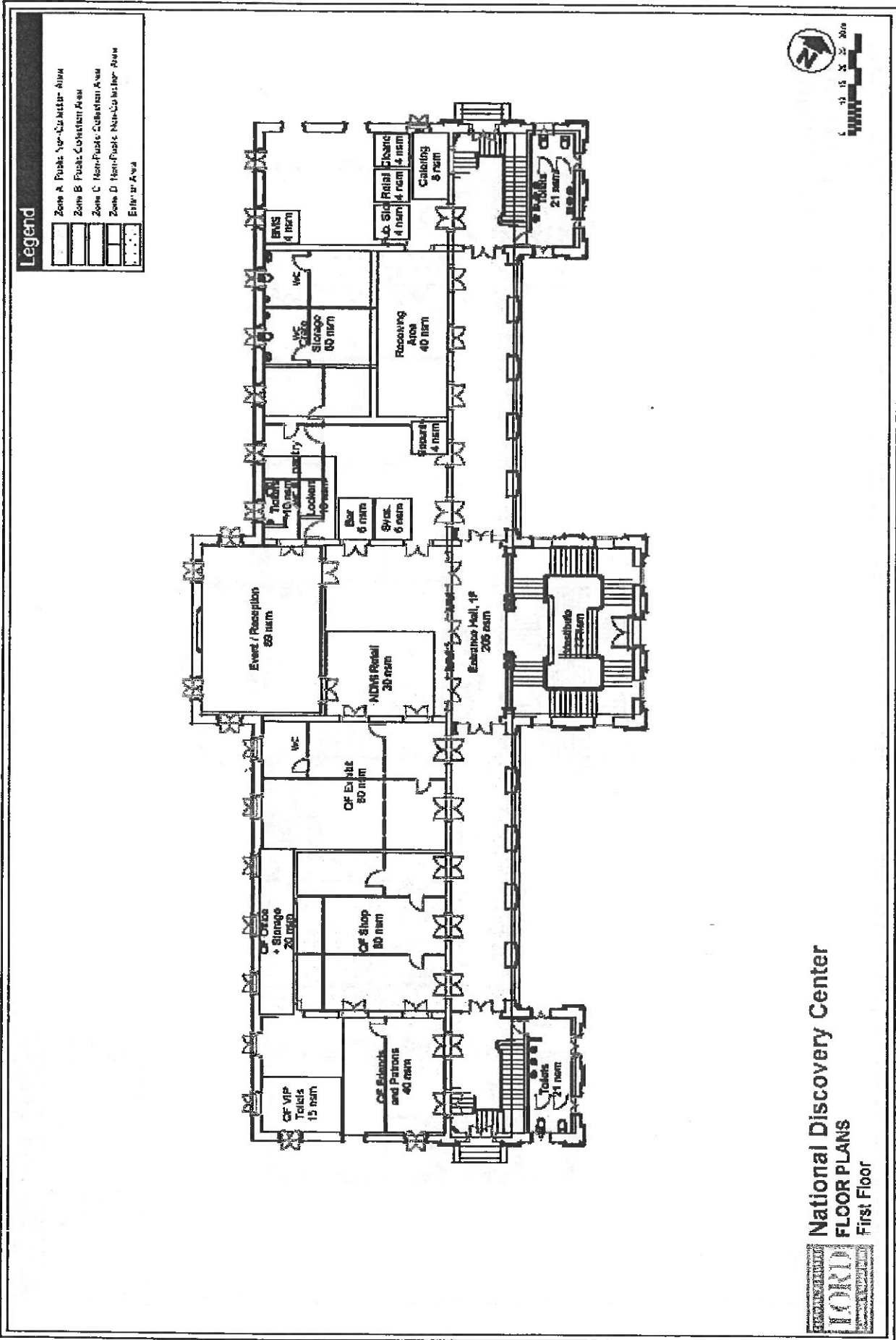


**Jantaburi Narunart Building
Zone D: Non-Public Non-Collection**

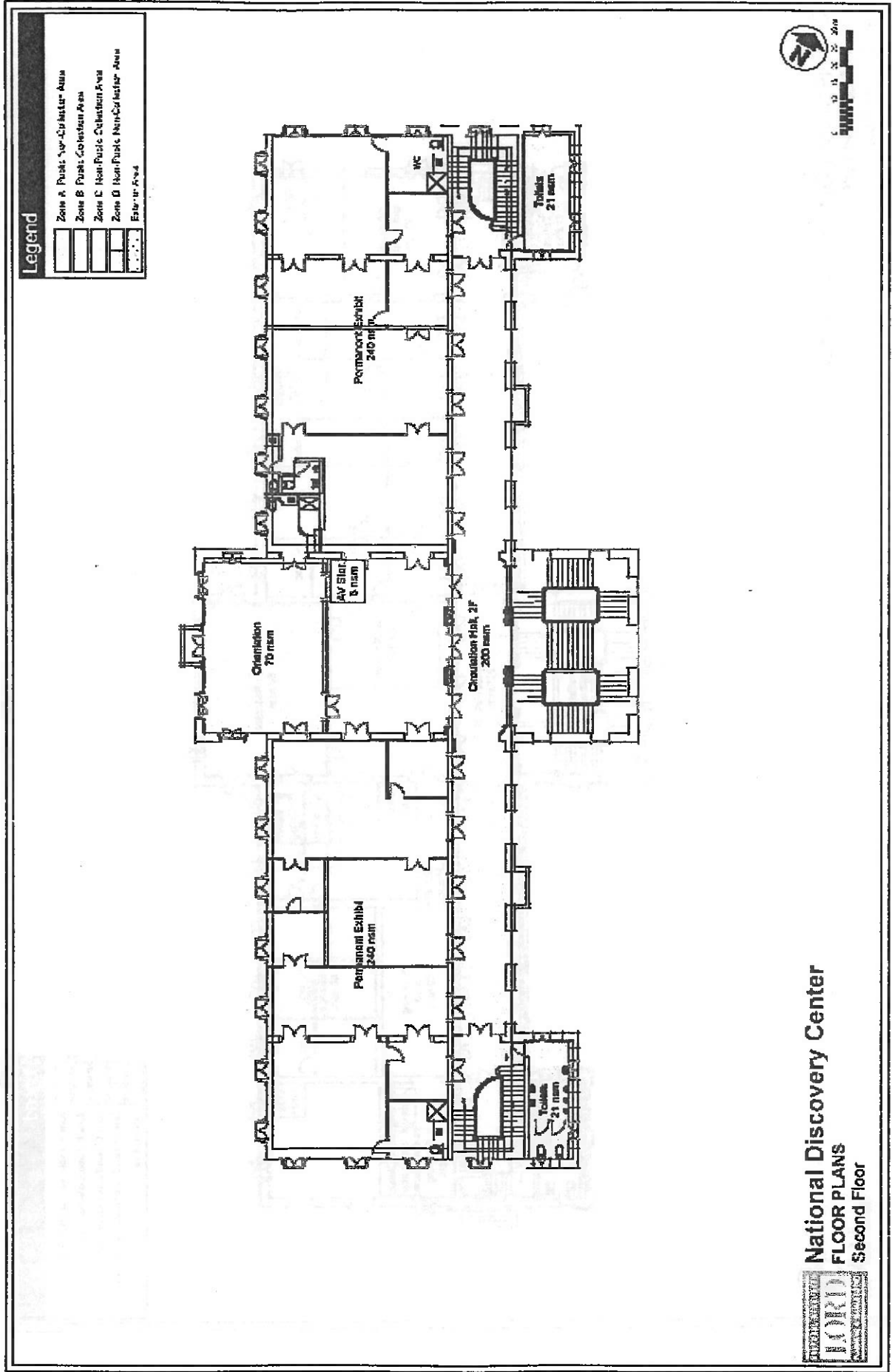


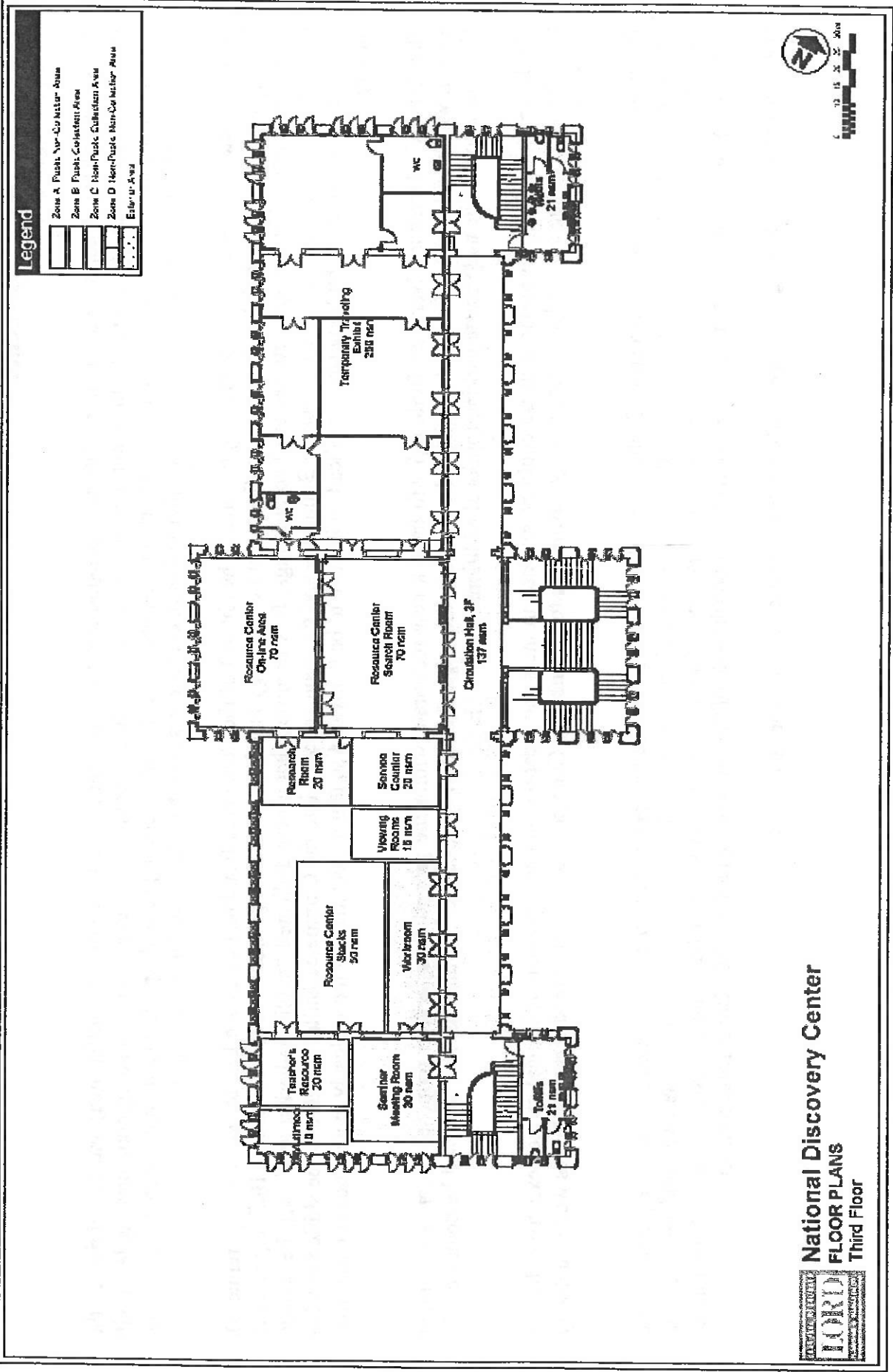
**National Discovery Museum Institute
BUILDING BLOCK DIAGRAMS
Phase One**





NATIONAL DISCOVERY MUSEUM INSTITUTE
 Demonstration Project - Master Plan





5.3.2 Phase Two: New Construction

The second phase of construction will involve an expansion into the adjoining property (removal of buffer area) and demolition of the structures on that part of the site. At this point, new access routes into the site could be designed, and an underground parking level will be constructed to accommodate visitor and staff parking. The ground level will be developed with specific landscaping treatment to allow for several gathering areas: groups (school and other visitors), outdoor arts & crafts, and general gathering space.

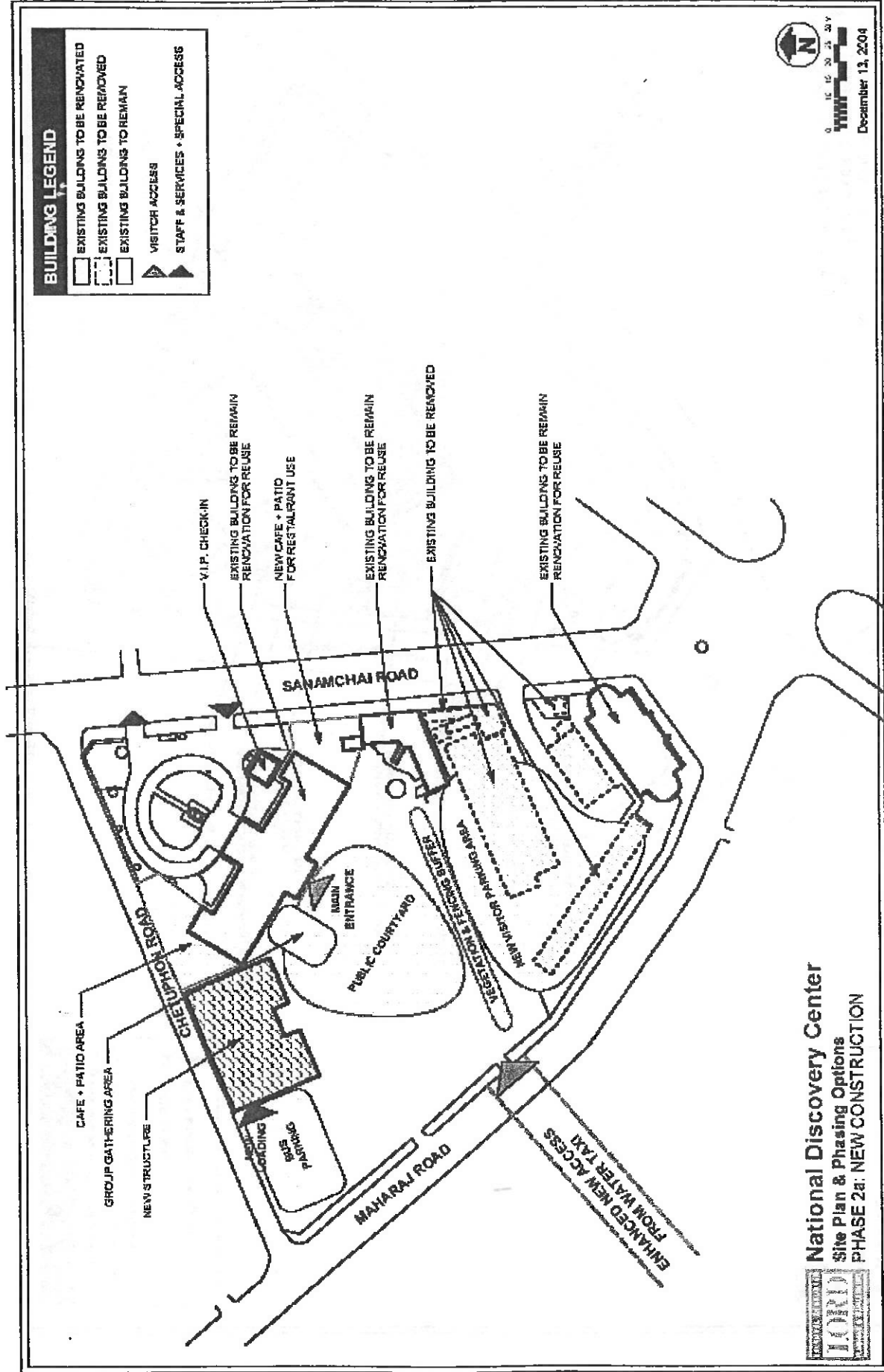
A new structure will need to be constructed, to equal in height that of the Commerce Building (see Space List for general requirements). The location of this new building is not yet confirmed, but the strategy is to have it in close proximity to the Commerce Building so as to allow for comfortable passage between the two buildings. It is proposed that a new dedicated “public gathering area” will be created between the new building and the Commerce Building – and the main entrance into the Commerce Building will now be shifted to what used to be the rear of the building (the rear façade will have to be renovated so that the details will more closely match those on the front façade).

The “Annex” (Jantaburi Narunart Building) will have a new restaurant within the ground floor, with a proposed secondary outdoor terrace, which will now buffer – and restrict – the access to the original front of the Commerce Building. This area will be dedicated for VIP access to the site and private parking (optional additional staff parking).

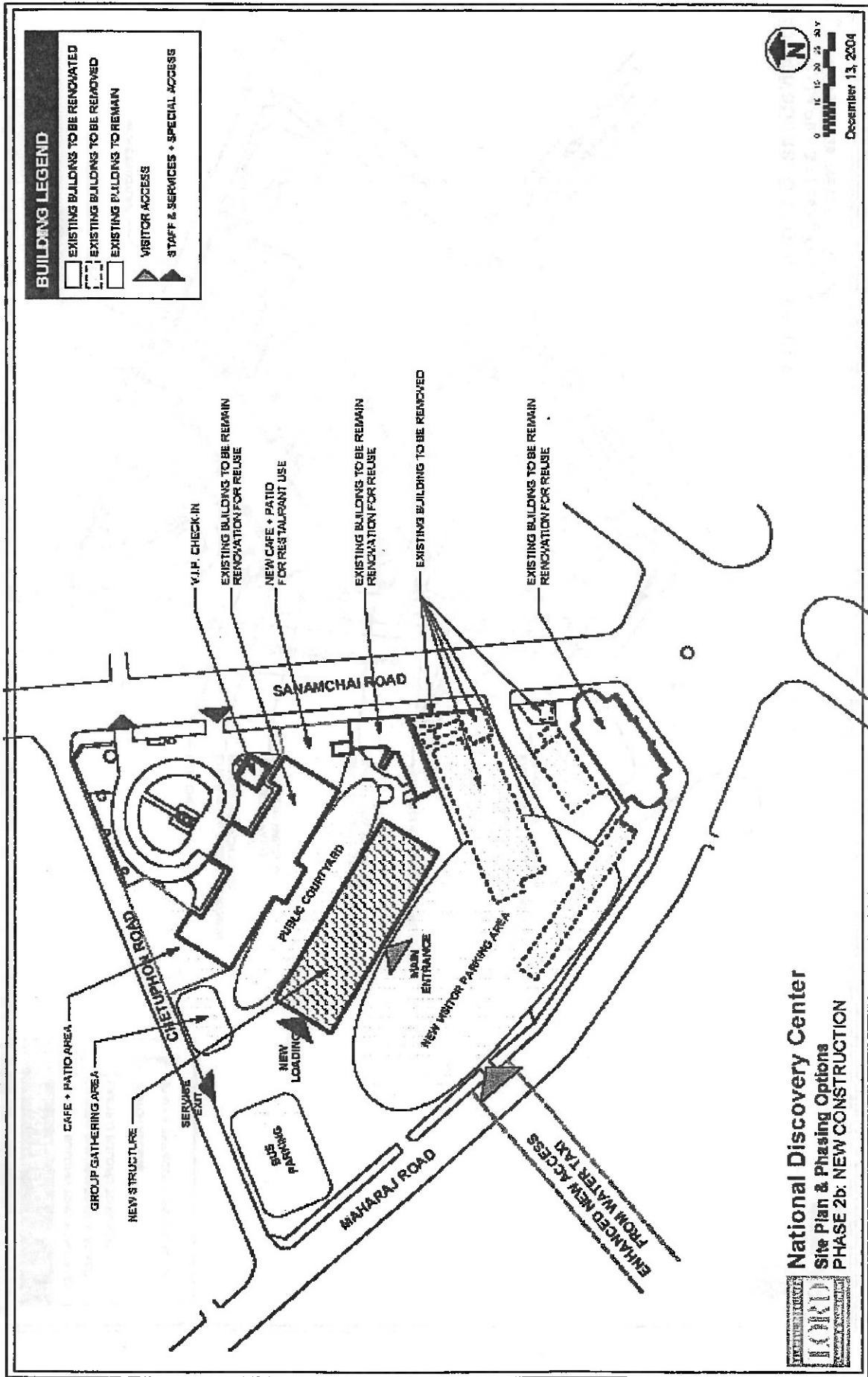
The bus parking from the previous phase could be retained in the same location, and an (optional) additional service exit from the site could be made on the north edge of the property, opening onto the one-way Chetuphon Road. This could serve for bus as well as delivery exit from the site.

The removal of the Juvenile Detention Center across the street will provide an open vista to the river, which should be exploited to the maximum: physically opening the renewed site to the water will increase its visibility to the other side of the river, and will turn the Rajini Pier (also requiring retrofit and development) into one of the main river taxi stops of Rattanakosin Island. This will be further enhanced by the potential reopening of the canal on the opposite side of the site leading past the Pak Klong Talak Market.

Please refer to the following two pages outlining two proposed options for Phase Two.

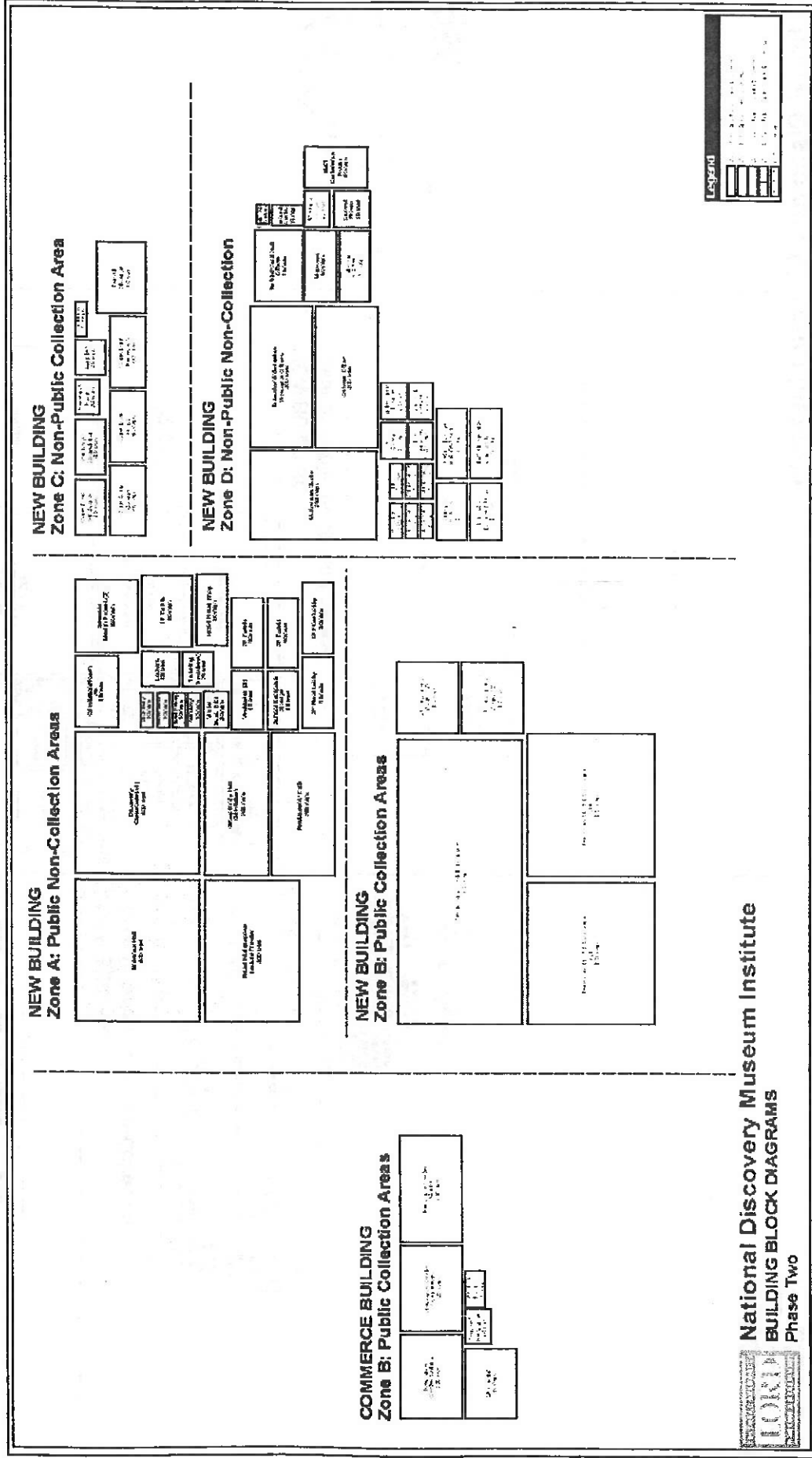


NATIONAL DISCOVERY MUSEUM INSTITUTE
 Demonstration Project - Master Plan



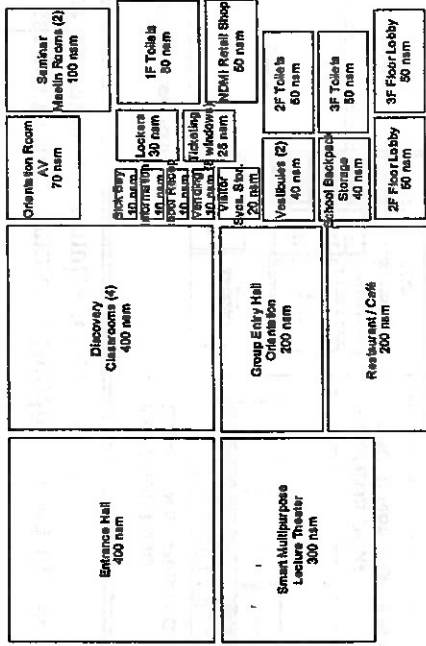
5.3.3 Space Allocation in Phase 2

The following diagrams illustrate how the space program changes to the Commerce Building, when the New Building is available in Phase 2. This should not be interpreted as a firm design of the space but rather as stimulus for discussion.

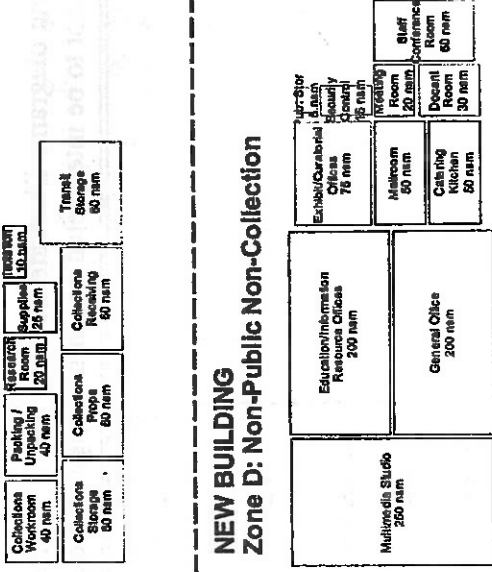


National Discovery Museum Institute
BUILDING BLOCK DIAGRAMS
 Phase Two

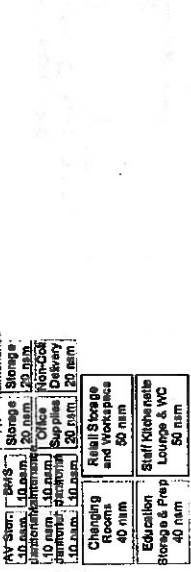
**NEW BUILDING
Zone A: Public Non-Collection Areas**



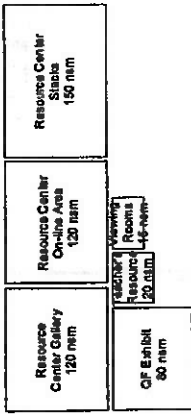
**NEW BUILDING
Zone C: Non-Public Collection Area**



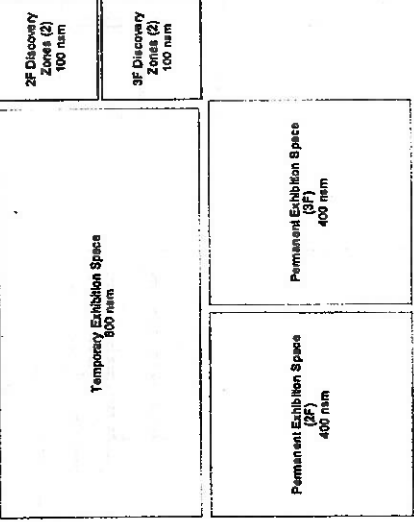
**NEW BUILDING
Zone D: Non-Public Non-Collection**



**COMMERCE BUILDING
Zone B: Public Collection Areas**



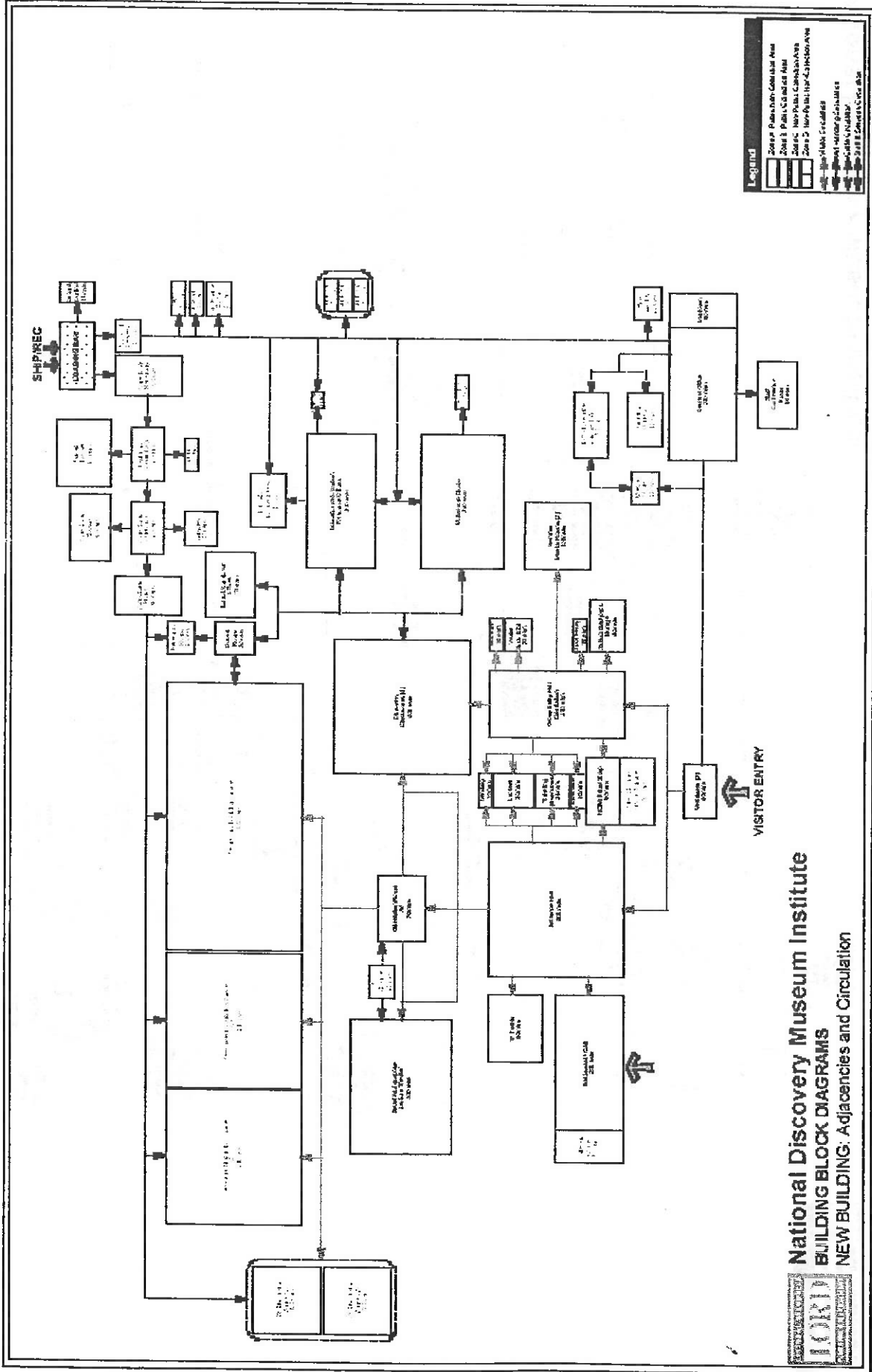
**NEW BUILDING
Zone B: Public Collection Areas**

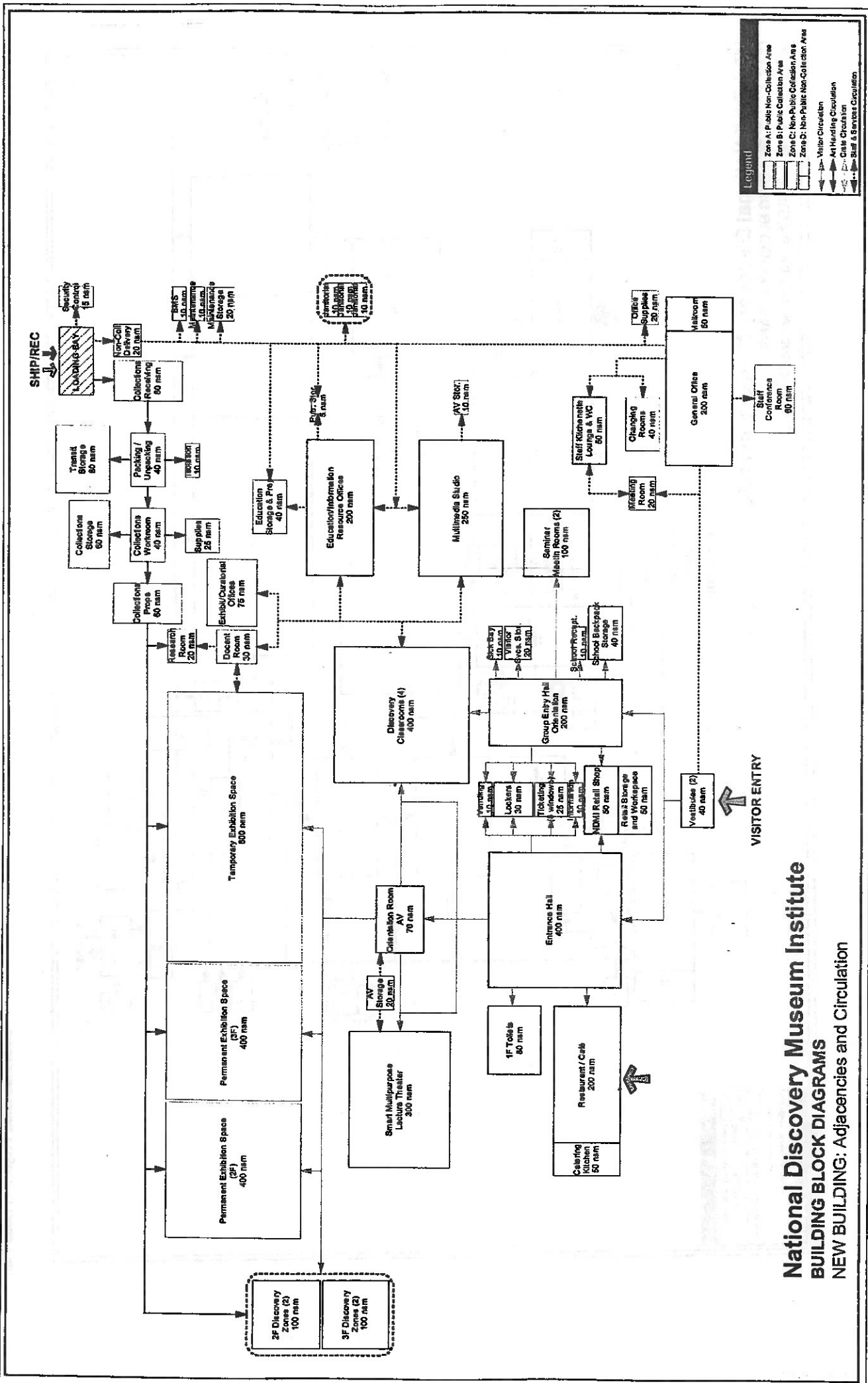


**National Discovery Museum Institute
BUILDING BLOCK DIAGRAMS
Phase Two**

Legend

- Zone A: Public Non-Collection Area
- Zone B: Public Collection Area
- Zone C: Non-Public Collection Area
- Zone D: Non-Public Non-Collection Area
- Exhibit Area





National Discovery Museum Institute
BUILDING BLOCK DIAGRAMS
NEW BUILDING: Adjacencies and Circulation

5.4 Summary of Systems and Standards

This report specifies systems and standards, or design criteria, for building systems, based on museum professional practice, required for the National Discover Museum Demonstration Project in Bangkok, or for particular zones as indicated, but with an emphasis on spaces containing collections. It includes a summary of environmental requirements and other critical space planning considerations organized in the following sections:

- Electrical service
- Elevators
- Environmental Requirements
- Lighting
- Materials and Finishes
- Security

The systems and standards are a collection of principles by which a building may be designed. They are not the specifications to which the building will be constructed.

5.4.1 Electrical service

Electrical service to the site and especially to the Commerce Building will likely have to be enhanced in order to serve the needs of new building systems, exhibition halls and the proposed theatrical experience. Projection of specific requirements will be made once more detailed exhibition and engineering requirements are known. As a contribution to that calculation, the following service requirements are indicated:

- Lighting grids using flexible track lighting should be provided in all exhibition halls at a minimum spacing of 3 metres.
- Floor outlets (mounted flush) will be required in exhibition halls and the public areas of the Resource Centre at minimum 2 metre intervals.

5.4.2 Elevators

A minimum of three elevators should be provided to serve the Commerce building, locations to be determined by the architect. One should be designated as a service elevator, accessible only to non-public areas.

5.4.3 Environmental Requirements

Levels of environmental control will be established on a zone basis, in keeping with the zoning analysis.

In Zone A there will be a mix or unmodified air (in open porches and other unenclosed areas, and conditioned air that is set at human comfort levels.

In Zone B there will be two sub-zones of conditioned air. In the Temporary Exhibition gallery, standards will be based on those required by international lending museums referred to below as Museum Standard Environmental Standards. During Phase 1, all other spaces in Zone B will be designed to adhere to a more relaxed standard under which temperature will be maintained in a narrow range, but RH will be allowed to fluctuate more widely. This recommendation is made on the assumption that any exhibits requiring more stable environment can be placed in micro-climate controlled cases. (see separate section)

In Zone C the same standards will apply as in Zone B, with the stricter standard being applied in the Temporary Holding and Storage areas.

In Zone D, conditioned air will be provided at human comfort levels.

Museum Standard Environmental Requirements

The environmental requirements generally proposed to be maintained by museums that accept traveling exhibitions or which borrow objects from other institutions are:

Relative Humidity and Temperature:

Temperature and humidity are key agents of deterioration. Relative humidity (RH) is a ratio of water vapour in the air to the amount it could hold if fully saturated, and is expressed as a percentage. Low levels of relative humidity mean dry conditions since the air is then capable of taking up moisture. High values are recorded when the air is already humid or wet and unable to take up much additional moisture.

Extreme, or rapidly fluctuating, relative humidity poses a major threat, especially to organic materials. Their hygroscopic nature (they can rapidly absorb and release water) means that they quickly expand and contract, generating stresses which cause damage such as cracking. The goal for most types of museum collection is avoiding rapid RH change (no greater than +/- 3% in one hour, +/- 5% in 24 hours) while staying within the range of 40-65% RH.

If relative humidity is controlled, temperature control is generally less crucial. Ironically, however, since the human body is far more sensitive to heat and cold than to humidity, it is temperature control that is more often seen as the priority in public buildings. Public areas are usually kept between 22-24°C. For collections care, a range of 15-25°C is acceptable for most collections, while stores can be kept at lower temperatures (there is no lower limit, provided humidity is still controlled) to reduce decay rates. It is usually calculated that a 10 degree drop in temperature will cut the rate of decay in half.

To be determined is the RH level at which collections areas that come from Thailand or other parts of South-East Asia or which serve only the needs of the National Discovery Museum are to be kept. The average temperature over the course of the year is 29 degrees C with an average relative humidity of 87% in the morning declining to 59% in the evening. The average dewpoint, which represents the point when RH reaches 100%, is 23 degrees. As a consequence, most of these collections have been acclimatized to a relatively high average RH and temperature and maintaining a lower RH level suited to international conditions would be both costly and potentially damaging to the collections as well as the historic fabric of the building. An average RH closer to the natural annual average should be considered for collections preservation and ease and cost of operation reasons.

Based on the foregoing analysis, the RH set point and standard fluctuation shall be 55 to 60 ± 3% RH (52 - 63%). The temperature set point and fluctuation shall be 23° ± 1° C. Prolonged exposure of collection to RH above 65% may lead to growth of moulds as well as an increased rate of material deterioration.

Standby equipment or redundancy is required to 60 - 75% capacity per piece, total capacity of 120 - 150%. The fans are to operate 24-hours per day to provide air circulation within the collections spaces. The mechanical engineers are to determine by computer simulation the most economical temperature(s) at which to maintain these areas while maintaining stable RH levels.

Normal Air Conditioning to human comfort levels should be provided in all Public Non-Collections spaces and Non-Public Non-Collections workspaces, plus corridors and elevators. It may be possible to use night setback of the temperature in most of these areas. Normal Air conditioning 24 hours a day will be required in the Security Control Centre and the IT Server Room.

Air Cleanliness:

Pollutants in the museum atmosphere may trigger or increase corrosion or other processes of deterioration, especially if coupled with high temperature or humidity. External sources for both gas and particle pollution include vehicle and factory emissions, and burning fossil fuels. Within the museum, pollutants may derive from building maintenance, items already in the collection (eg some kinds of unstable plastics or unsealed wood), cleaning agents, display cases or storage materials.

Of particular concern are materials used to construct museum displays. In the confined atmosphere of a display case, levels of harmful pollutants can cause chemical changes, even without physical contact. For example, *hydrogen sulphide*, exuded by wool, leather, parchment and certain adhesives, will tarnish silver, polished copper and photographic prints and negatives; *sulphur dioxide* will harm paper, leather and some types of stone, while *organic acids* (eg *acetic acid*), contained naturally in wood, stimulate corrosion, particularly of lead.

Infiltration of external pollutants as well as removal of internal ones through air recirculation can be controlled with appropriate filtration. A recommended standard is:

≥ 90% efficiency particulate filtration according to the efficiency test portion of ASHRAE Standard 52.1 - 1992, *Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter*. Gaseous filtration utilizing activated carbon filters.

SO ₂	< 1 µg/m ³ (0.4 ppb)
NO ₂ , HNO ₃	< 5 µg/m ³ (2.0 ppb)
O ₃	< 2 µg/m ³ (1.0 ppb)

The filter bank should consist of:

- 30% efficient prefilter
 - 85% efficient medium filter
 - activated carbon filter
 - 90% efficient final filter to capture activated carbon dust;
- Or:
- 30% efficient prefilter
 - 90% efficient fine filter

- activated carbon filter
- 30% efficient filter to capture activated carbon dust.

Fire Detection and Suppression

In addition to code requirements for public assembly areas, smoke detectors are recommended in collection storage and display areas. These should be linked with a central alarm system. Wet pipe sprinkler systems are recommended in all areas as they are faster in response and more reliable than other options.

Floors

Floor loading capacity in public areas should be based on code standard for public assembly areas. Areas where collections are to be stored may require strengthening to library loading standards. Corridors and other high traffic areas should be tiled (as they already are in most areas) and, in order to reduce museum fatigue, industrial quality low pile carpet should be used in other areas. Carpet with rubber backing or underlay should be avoided because of potential off-gassing and disintegration under heavy use.

Lighting:

Light can create serious irreversible damage to museum collections. Light is a form of energy and can cause fading, and deterioration, in the materials from which an object is made. Most objects are affected by light, although metals and ceramics not to the same extent as other materials. Light is measured in lux (or lumen per square metre. 10 lux equals the amount of light produced by 1 candle at a distance of one foot (therefore 10 lux = 1 foot candle).

Light produces damage in proportion to its intensity and the exposure time of the object. A light of 500 lux will theoretically cause the same amount of damage in one year as a light one-tenth the strength (50 lux) will produce over ten years; or, if two 100 watt lamps are put in place of one, then the same amount of damage will occur in half the time. Thus short exposure to a high lux (eg 2500 lux caused by photographic or laboratory lights, or 200 lux for short exhibitions) need not cause undue damage over the total life of an object, provided this high exposure is compensated by a proportionate period of time in a lower than normal illuminance, or in total darkness.

Hence, while it is usual to reduce light-levels in museum displays, this need not be the only response - reducing the time during which an item is exposed to light is equally legitimate. Fitting display lights with a timer, or, if continuous lighting while on display is required,

limiting the overall time an object is on exhibition in a given year, is appropriate. For the most light-sensitive objects, it may be useful to establish annual lux-hours exposure limits. Lux-hours are a measure of exposure (illumination x time).

The effect of any measures to reduce visible light levels is to darken a room, a change all the more apparent to the human eye if made too rapidly. Measures such as the gradual reduction of lighting levels in preceding spaces, giving visitors' eyes time to adjust, can usually compensate. Neutral-density window film reduces the amount of light entering, but still allows the visitor to look out, while from the outside the window appears darkened. Such films can offer an effective alternative to blocking or blinding a window.

Most light sources, natural and artificial, also emit some ultraviolet (UV) radiation. This is light beyond the limit of human vision, at the violet end of the spectrum, and is also damaging to most museum objects. Since UV is not needed to view objects, and it can readily be reduced through the use of filters, elimination should be the target. A meter is used to measure the proportion of UV in the light source in microwatts per lumen ($\mu\text{W}/\text{lumen}$) - a maximum acceptable reading is $75\mu\text{W}/\text{lumen}$, although filters should be able to reduce this to less than $10\mu\text{W}/\text{lumen}$. A periodic check is needed to test the continuing efficiency of UV filters (especially of window coatings and film), as this declines over time.

Reducing damage by light - a summary

- 50 lux (5 footcandles) for specially sensitive artifacts - limit exposure to 120,000 lux-hours per annum (11,150 footcandle-hours per annum). Examples include works of art on paper, textiles, feathers, dyed leather, felt pen ink, et cetera.
- 200 lux (19 footcandles) for sensitive artifacts - limit exposure to 500,000 lux-hours per annum (46,470 footcandle-hours per annum. Examples include all other organic materials, oil and varnished tempera paintings, et cetera.
- 300 lux (28 footcandles) for insensitive art, which includes most stone, glass, ceramics, unpainted metal, et cetera.
- 200 lux (19 footcandles) at 3 feet AFF in collection storage areas.
- 5 lux (0.5 footcandles) at 3 feet AFF for security lighting in CCTV monitored areas.
- Maximum of $10\mu\text{Watts}/\text{lumen}$ of UV light at the lux levels proposed above.
- Correlated Colour Temperature (CCT) of fluorescent and other discharge lamps is to be appropriate to other light sources in the space.

- Colour Rendering Index (CRI) of fluorescent and other discharge lamps to be a minimum of R_a (rendering average) of 85, R_{w} (rendering worst) of 75.
- Infrared heating - avoid direct sunlight exposure and control daylight and electric light readings to the lux levels proposed above.

Materials and finishes

All materials and finishes in the museum should be tested or specified to ensure that they do not give off gases that can attack sensitive artifacts or become unsightly due to premature wear or failure. This is particularly important with

- Cases and storage cabinets
- Floor surfaces
- Paints and varnishes
- Other materials in direct contact with collections

Further advice is provided in the following appendices to this chapter.

APPENDIX 1 - Temperature & Humidity

Types of Museum Object requiring exceptional RH conditions

MATERIAL	OPTIMUM RH (50% unless stated)	ACCEPTABLE RH BAND (40%-65% unless stated)	SENSITIVITY (Indicates need for tighter control of RH than +/-3% per hour, +/-5% per 24 hours)	NOTES
Excavated Metals (non-ferrous)	35% (less if possible)	15-55%		

Excavated Metals (ferrous)	15% (less if possible)	0-40%	
Coins & Medals	15%	15-40%	Depends on corrosion products, oxides and patina formation, and their degree of stability
Ceramics, Tiles, Stone	20%	20-60%	Depends on the activity of embedded salts, and if corrosion products are present
Geology (general)		45-55%	
Geology - Pyrites & Marcasite (& fossils containing these minerals)	30%	30-50%	Should never exceed 50%RH
Geology - Sub-fossil bone, tusks & teeth; fossils with shale or clay matrix			Should never be less than 40%RH
Paper	45%	40-55%	Some authorities recommend less

<p>Photographs</p> <ul style="list-style-type: none"> - B & W prints - B & W negatives - glass negatives - colour prints - colour slides / colour negatives 	<p>40% 35% 30% 40% 25%</p>	<p>30-50% 30-40% 20-50% 30-50% 25-30%</p>	
<p>Costumes, Textiles</p>		<p>30-50%</p>	<p>Silk & wool are more sensitive to moisture damage than cotton or linen.</p>
<p>Glass (crizzled)</p>			<p>Grizzled glass needs a narrow band of controlled RH to prevent advance of this condition.</p>
<p>Furniture (Inlaid)</p>			<p>Inlay work needs particular stability; exact sensitivity varies with wood type, adhesive used, & the condition of surface or barrier coating</p>
<p>Lacquer ware</p>		<p>50-60%</p>	<p>Japanese authorities recommend higher levels (to 70%)</p>
<p>Paper (stretched)</p>		<p>45-55%</p>	<p>Paper screens, drawings on stretched frames etc. need narrow band</p>

<p>Ivory, bone (carved)</p>		<p>50-60%</p>	<p>Carved items require more control than anatomical collections (although less than sub-fossil material). Dimensional responses very slow, except when in thin sheets egg miniatures on Ivory</p>
<p>Leather, skins, binding</p>		<p>45-60%</p>	<p>Variable according to the tanning process used</p>
<p>Paintings (on canvas)</p>	<p>(see notes)</p>	<p>40-55%</p>	<p>Unlined paintings, or paintings lined with hygroscopic adhesives, are more reactive than those lined with wax or synthetic materials. NB Some sources suggest that temperature variations (even short-term and slight) pose a greater risk than RH fluctuations, due to varied thermal expansion of the paint layers</p>
<p>Paintings (on wood)</p>		<p>45-60%</p>	<p>Depends on type, grain & thickness of wood, the ground and the method of jointing sections. Some need narrow RH levels to minimise warping</p>
<p>Wood (painted & varnished)</p>		<p>45-60%</p>	<p>Includes musical instruments, models</p>
<p>Plastic</p>	<p>40%</p>	<p>30-50%</p>	<p>In general, plastic materials have slight humidity responses, but do warp when in thin sheets & exposed to varying conditions. Low RH causes electrostatic properties, encouraging dust accumulation</p>

Parchment, Vellum	50-60%	Narrow control required because of great hygroscopicity
Metalwork (historic)	35%	Depends on condition of metal, and oxide formation. Other components (egg wooden handles) may restrict ability to go lower than 50% RH

APPENDIX 2 - Light

Recommended light exposures for museum collections on display

MATERIAL	RECOMMENDED MAXIMUM VISIBLE LIGHT LEVEL (lumen per m ² , or lux)	RECOMMENDED MAXIMUM ANNUAL LUX HOURS EXPOSURE (Illuminance x time) ^B
Costume, textiles Watercolours, prints, drawings Paper items (including wallpapers, manuscripts) Photographic prints (colour) Transparencies	50 lux ^A	96,000

<p>Natural history (most) Ethnography (most)</p>	<p>50 lux^A</p>	<p>96,000</p>
<p>Minerals (light-sensitive examples, including argentine, celestite, chalcocite, fluorite, lepidolite, pyrostilpnite)</p>	<p>50 - 200 lux</p>	<p>96,000 - 384,000</p>
<p>Furniture (inlaid or with grain/surface feature) Plastic (especially Bakelite, Ebonite & polythene)</p>	<p>100 - 200 lux</p>	<p>192,000 - 384,000</p>
<p>Paintings (oil & tempera) Undyed leather, wood, horn, bone, ivory Lacquer ware Furniture</p>	<p>200 lux</p>	<p>384,000</p>
<p>Photographic Prints (black & white)</p>		
<p>Metals Stone Glass Ceramics Geology (except some minerals, as above)</p>	<p>300 lux (material would not be unduly harmed by higher, but a maximum level at this reduces the eye adaption difficulties for visitors where other collections [as above] are displayed in darker illumination; for similar reasons a maximum illuminance of 400 lux in the remaining public spaces in a museum might be recommended)</p>	<p>576,000+</p>

^A 50 lux is most often cited in the literature as the acceptable light level for this category, although Japanese authorities have chosen 100 lux as the lower threshold. Museum designers and curators generally prefer this higher value for reasons of colour rendition and visitor perception. At all low levels of illumination the use of an artificial source such as tungsten light is preferable, as it has a warmer feel than daylight of the same intensity.

^B There is no published source for these recommendations; they are calculated assuming an exposure to the recommended maximum lux for 8 hours a day, five days a week, 48 weeks a year; in many situations museums will be doing well if they restrict exposure to no more than double these amounts.

Appendix 3: Pests

Measures to prevent pest infestation, and to mitigate their effects:

- Set monitoring traps widely; inspect regularly
- Ensure gaps in building fabric are closed (close pest entry routes)
- Keep temperatures low (most practical in stores)
- Inspect collections regularly, especially the most 'at risk' items (which might be labelled as such)
- Isolate or cover new acquisitions, to contain any emerging adults, if in doubt about their state
- Remove external accretions of pigeon droppings (carpet beetle larvae love this); try to deny roosts on ledges
- Have good housekeeping regimes, that remove dust (curved skirting boards reduce it collecting) and, in particular, clean light fittings (warm places, where insect corpses can gather, especially in fluorescent light diffusers)

APPENDIX 4 – Pollutants

Materials for display and storage

MATERIAL	PROBLEMS	GENERAL RULES	BEST	WORST
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<p>Wood & Wood Panel Products</p>	<p>Acids are released, as vapour or liquid, from wood; acidic vapours arise from formaldehyde-based resins used as the bonding adhesive</p> <p>There is little control over the wood species used in wood products</p>	<p>No wood or wood product is perfect</p> <p>Consider substitutes (eg acrylic sheet, glass)</p> <p>If used in a display case, cover the side facing inside with an impermeable material¹ to improve the seal around the wood or wood product</p> <p>Wherever possible seal wood and wood products (especially cut edges) with suitable paint, varnish or lacquer</p>	<p>Aged/Seasoned Dry</p> <p>Certain species (eg beech, birch, mahogany)</p> <p>Wood products for marine or exterior use</p> <p>Overlaid plywood (eg high or medium density overlaid plywood)</p> <p>Plastic-laminated panel (eg Formica, Melamine)</p> <p>Blockboard</p>	<p>Green</p> <p>Unseasoned</p> <p>Knots</p> <p>Certain species (eg red cedar, oak, Douglas fir, sweet chestnut)</p> <p>Chipboard</p> <p>Hardboard</p> <p>Plywood (interior grade)</p>
<p>Plastics & Rubber, Foams & Foam-boards</p>	<p>Some plastics release harmful degradation products and additives</p> <p>Rubber is unstable & perishes under most conditions over time</p>	<p>Choose acid-free (or acid-reduced) products</p> <p>Avoid Polyurethane or rubber-based materials</p>	<p>Polyethylene (PE)</p> <p>Polypropylene (PP)</p> <p>Polyester</p> <p>Polyethylene (PE) foam (eg plastazote)</p>	<p>Poly vinyl chloride (PVC)</p> <p>Rubber with sulphur vulcanising agents</p> <p>Polystyrene</p> <p>Polyurethane foam board</p> <p>PVC foam board</p>

<p>Paints, Varnishes & Stains</p>	<p>Release organic acid vapours, peroxides etc at different rates Products have variable efficiency as a barrier to volatiles No coating is a complete barrier</p>	<p>Wait at least one month before putting object in a closed system, to allow for evaporation of solvents Cover coating on side facing inside a case with an impermeable material¹ to improve the seal around the coating</p>	<p>Water-based paints</p>	<p>Corrosion-resistant paints Oil-based paints Oil-modified polyurethane varnish</p>
<p>Adhesives</p>	<p>Release corrosive or otherwise damaging gases during curing or on ageing Solvents & adhesives may be transferred to objects Adhesives may embrittle, ooze, yellow, become acidic</p>	<p>Use alternatives if possible (eg screws for joints, brass staples for attaching lining fabrics) Wait at least one month before putting object in a closed system, to allow for solvent evaporation Never use adhesives to secure objects or their labels (substitute with perspex mounts, brass pins etc)</p>	<p>Acrylic contact cements Certain acrylics & 2-part epoxies Certain poly vinyl acetate (PVA) emulsions & ethylene/vinyl acetate copolymers (EVA) Transparent acrylic adhesive on polyester tape Pure acrylic tape without carrier</p>	<p>Polysulphides Most poly vinyl acetate (PVA) emulsions & solids Natural & synthetic rubber cements (most contact cements) 'Biu-tack' (& similar) 'Sellotape' (& similar) 'Plasticine' (& similar) Masking tape</p>
<p>Textiles</p>	<p>May have finishing treatments that compromise their inherent good qualities</p>	<p>Avoid wool products (includes standard felts) Check dyes are colourfast and sulphur-free Wash fabrics before using Use undyed, unbleached fabrics for storage (eg dust covers)</p>	<p>Unbleached cellulose-based materials - cotton - linen - hessian Polyester</p>	<p>Wool (tarnishes silver) Fire retardant treatments Carpet material (accumulates dust; especially avoid rubber-based backings)</p>

6. Implementation Strategy

This final chapter provides a strategy for moving forward on the Master Plan and achieving the goals as set out in the vision for the NDMI. As the NDMI has been in existence for several months already, first in a developmental mode, and now as a legal body, initiatives have been undertaken on facility planning and design, staffing, financial planning, public programming, and exhibition development. These initiatives are largely in keeping with the direction put forth in this Master Plan. This strategy presents key tasks within the various planning components:

- NDMI National Role
- Organization
- Staffing
- Exhibition and Public Programme Concept
- Marketing Strategy, Revenue and Cost Projections
- Space and Facility Programme

The most time-sensitive issues facing NDMI are the tasks regarding the Ministry of Commerce site, specifically: the tender of the architectural work on the site; the detailed site planning and phasing of the Commerce site and the inclusion of the Detention Center land and the Police Station within the long-range plan; the removal of un-needed buildings from the site; rehabilitation of the Commerce Building and the Jantaburi Narunart Building; and beginning construction of the Phase 2 facilities. If Phase 1 is to open as scheduled in December 2006, the site related work should begin in March 2005. Ideally the work on the Commerce Building would be completed by August 1, 2006, so that there could be handover of a “clean building” to the exhibition fabricators for beginning of the on-site installation of the exhibitions. This would allow for a “soft-opening” one month in advance of the official opening. A similar schedule should be followed for the set up and fitting out of the Resource Center, as it is adjacent to the galleries. The hardware and software requirements for the Resource Center always require more time than anticipated for trouble-shooting and refinement of the IT and multi-media.

Similarly, there is a need to continue with the exhibition development, and fabrication and installation. This could be set up as two work components that are open to tender. This is detailed in section 6.4 below.

6.1 NDMI National Role

The following tasks should be undertaken vis-à-vis a Strategic Plan for the NDMI, as it will impact on the specific role of the Demonstration Project:

- Prepare a Strategic Framework for NDMI as per the example provided in Chapter 1 (1.4, page 9)
- Plan and confirmation an Institutional Development Program of national scope, within which the Demonstration Project serves as a model;
- Plan and confirm a Museum Training Program of national scope, which also includes staff assigned to the Demonstration Project.

6.2 Organization

The following tasks should be undertaken:

- Confirmation (and modification if required) by the NDMI Board of Directors of the Fundamental Policy Framework (Vision, Mission and Objectives) in this report;
- Incorporation of the Foundation Statements in the Bylaws, Policies and Procedures of the NDMI;
- Printing of the Foundation Statements in the Employee Handbook and distribution to all staff and board members;
- Confirmation of the organizational structure of the NDMI into four departments: Academic Department; Programmes Department; Administration Department; and Operations Department;
- Develop and implement fundraising/development strategy.

6.3 Staffing

The following tasks should be undertaken:

Human Resources

- Prepare Human Resources Policy and incorporate in Employee Handbook;
- Confirm staff size and job descriptions. Initial staff of 45 FTE's increasing by additional 45 FTE's, primarily contractual staff, prior to opening of Phase 1 and additional 5 FTE's prior to opening of Phase 2;
- Prepare detailed hiring schedule based on the above, beginning with Academic Department and Administration;
- Advertise and hire Senior Management Staff and Professional Staff;
- Develop management reporting templates and implement use;
- Design and implement staff training program.

Security

- Assess/develop security plan;
- Develop disaster plan;
- Develop management reporting templates and implement use.

Facilities/Information Technology

- Assess overall IT needs, including those linked to exhibition galleries and Resource Center;
- Outline weekly/monthly maintenance priorities;
- Develop/update procedures for loading/storage of data;
- Develop "Office Services" unit for routine administrative processes.

Budgeting/Finance/Audit

- Review/develop long term line by line division operating budgets;
- Track start-up costs for each phase versus on-going expenses;

- Develop cash flow statements;
- Assess cash handling/recommend controls;
- Select financial management system;
- Establish and implement financial audit and programme audit system (such as exhibitions, education, public programmes and Resource Center). Financial audits should be annual. Programmes should report annually and be subject to a more detailed programme audit every two years, based upon a system of Performance Indicators, linked to budgets and the objectives in the Annual Plan.

6.4 Exhibition and Public Programme Concept

The most critical tasks are related to the Exhibition Development and Fabrication. It is recommended that this be pursued in two stages in the form of separate tenders. These are:

Exhibition Development Tender Structure

- Tender 1. Exhibition Development
 - Scope of Work: The detailed interpretative planning; design concept and detailed design; and project management of the fabricator
 - Organize Tender 1 in March 2005
 - Work to continue until public opening of exhibition in December 2006, as scope of work includes preparation of the exhibition fabrication and installation tender package, advice on selection of the successful fabricator, and supervision of the work of the fabricator through to opening
- Tender 2. Exhibition Fabrication
 - Scope of Work: Exhibition fabrication and installation
 - Organize tender following preparation of detailed design and tender package as described in Tender 1
 - Fabricator should be selected and begin work by December 1, 2005
 - Fabricator's work to be supervised (in-shop and on-site) by consultant selected in Tender 1

The following additional exhibition related tasks should be undertaken:

- Confirm temporary exhibition program schedule and proposed exhibition themes;
- Initiate “in-house” exhibition planning, with particular attention to exhibitions budgets and schedules;
- Begin negotiations for hosting loan exhibitions.
- Design and open NDMI website;
- Prepare detailed Public/Professional Programme Plan and begin development and implementation;
- Confirm collections policy and begin acquisition of artifacts, specimens and works of art for ‘open storage
- Prepare detailed plan for the Resource Center, begin acquisition of reference material and preparation of data bases;

6.5 Marketing Strategy, Revenue and Cost Projections

The following tasks should be undertaken:

- Confirm or modify the assumptions (Chapter 4, section 4.3.1, page 78) guiding the preparation of the projections;
- Develop a data base on characteristics of target market groups and update twice yearly;
- Establish contact with key stakeholder organizations and individuals in public/private education, museums and museum associations, universities, government and the general public. Incorporate into contacts/ mailing list;
- Develop the NDMI Marketing/Communications Plan, with staff requirements, budget, tasks and schedule;
- Establish contact with Tourism Authority of Thailand (TAT) and tour operators to promote NDMI as specialized cultural destination;
- Define and establish membership program;
- Establish contact with education authorities and integrate exhibitions and programs with curriculum;
- Develop teacher/instructor orientation programs;
- Creation of identity program/style manual for all printed (and IT) materials;
- Press previews/hard hat tours for press prior to Phase 1 opening;
- Develop and circulate promotional traveling exhibition on NDMI and its “Discover Thailand” approach and circulate throughout the country in advance of the Phase 1 opening;
- Develop retail strategy, store policy and procedures and acquire inventory

6.6 Space and Facility Programme

The following tasks should be undertaken:

- Finalize space allocation and building plans;
- Undertake renovations ;
- Facilitate building occupation.

6.7 Implementation Schedule

Key Tasks	2005												2006										
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Exhibition Development																							
Call Tender 1																							
a) Exhibition Planning																							
b) Project Management																							
Call Tender 2																							
a) Fabrication Period																							
b) On-Site Installation																							
Phase 1 Commerce Building																							
Detailed Plan																							
Demolition																							
Construction																							
Human Resources																							
Human Resource Plan																							
Staff Hiring																							
Training Plan																							
Training Workshops																							
Move to Facility																							
Phase 2 New Construction																							
Detailed Plans																							
Demolition																							
Construction																							

Appendix A. Summary of Vision Workshop, November 17, 2004

Participants' perspectives towards National Discovery Museum Institute

This section will interpret the information gathering from responses and feedback regarding the National Discovery Museum through interviews with key stakeholders and at the Vision Workshop held on 17 November 2004 at Miracle Grand Hotel on the topic of "What you give and what you get".

The interviewees are the Researcher and Manager of Product Development of TAT, the Director of National Museum in Thailand, three academicians, the Director of the Institute of Language and Culture for Rural Development, Mahidol University and 100 participants in the workshop divided into five groups, who are academicians from the universities, students in primary and secondary school from Rajinee School and Vajiravudh College, the representatives of private and public organizations, institutions, foundations and associations. The objectives of this workshop was to receive stakeholder and the public's perceptions of the National Discovery Museum Institute regarding the concept, the site, marketing and partnership programs by using SWOT analysis. The results are as follows:

Area and Site analysis: Commerce and other buildings, transportation and facilities

Strengths

- The location is in a historical site surrounded by many significant places such as Ministry of Defense, Ministry of Foreign Affairs, and Royal Survey Department. This could be a great opportunity to include the other sites as mentioned above to become one cluster and network to assimilate the knowledge for people. The Commerce Building itself, has been established since His Majesty King Rama the Third.

- The Commerce building the characteristics of architecture displays, culture and arts in this period.
- This building will attract people who like the heritage building with Thai architectural style
- Identified as an Historical Site, many tourists will be able to walk to the museum from Grand Palace and National Museum.
- Good conditions of trees will be able to create the garden inside or outside the site

Weaknesses

- Traffic jam and the limitation of car parking

Recommend:

- A car park area at the Commerce site
- Underground transportation
- Bus services
- Boat services along Chao Phraya river and canals
- Underground car park at Sa Nam Luang
- A walking district for people around the Rattanakosin Island, which is the origin of Bangkok in the past century with many historical places on this island.
- The Commerce Building might look traditional. Might not be interesting for youths or people who like modern style
- Limitation of open space because of too many small buildings in the site

Opportunities

- Opportunity to expand the area from the Commerce site to the pier “Ta Tien”.
- The Commerce site surrounded by many significant sites such as Ministry of Defense, Ministry of Foreign Affairs, which could possibly become a museum complex in the future, this is the advantage including Silpakorn and Thammasat University
- Wish to see the museum as Venice in the East

Facilities

Recommend:

- Provide the front area to become a common area for all people who visit the museum.
- Convenient in both transportation and facilities
- Warm welcome and good service from the museum staff
- One stop service: Restaurant, café shops and gift shops bank and post office to attract people
- This new museum should be a virtual museum, necessary to have website, archive library and e learning.
- Tools or any equipment should be adequate for visitors
- Providing a Green Campaign
- Build two glass lifts for the old people and incapacitated people

Concept: Objectives, visions, programs, market segmentation and management

Objectives and Visions

Opportunities: what we would like to see this museum in the future?

- This museum should be unique and have a distinctive theme; not required to compare with museum in other countries
- People should feel proud to be Thai and understand our own culture and understand of our multi cultural in this society
- Visitors could perceive the new knowledge every time they visited and then could bring the knowledge to create their own occupations. The new knowledge in the museum will encourage the visitor to come more often which would shown that the museum had done the market research and preparation and be able to manage the knowledge to attract the visitors.
- Thais are multicultural society, will attract the visitor to observe this in the museum.
- Benchmark this museum with other museums in other countries such as Singapore.
- Creating the exhibition circulation and activities in the exhibitions to attract the visitors.
- Should concentrate on quality rather than quantity of people.
- To be a world class museum should be concerned with the site strengths and weaknesses and the activities in the museum are relevant.

- This museum should be culture tourism like the Louvre museum in Paris. Visitors in this museum should be over 500,000 people per year. This museum will be the learning centre of Thailand.
- To build one museum will take time, at least Thai people will have a learning center to tell us about our land and our life, which is presented more clearly and complete compared to other existing museums.
- To build the image of this museum, when people think about Thailand, people think about National Discovery Museum.
- Wish to see the museum as a life long and continuous learning center.

Market Segmentation

Target Groups

- Primary: students
- Secondary: Children and family, potential to increase the interest of visit the museum every year, required to set the programme and activities for them to join such as father's day, father can enter free.
- Third: Tourist (both Thai and International)

Weaknesses

- To target the majority Thais might be a weakness because Thai people do not have an awareness of visiting museums. They also lacking of knowledge of museums.
- Necessary to study the psychology and behaviors of Thai students. Especially, boom and bust cycle.

Programs

Recommend:

- Divide activities and exhibitions to each visitor target group for example:
 - Children and family: Fun activities, lead the playing rather than learning. Avoid too many academic and deep contexts. Hands on method interested to this group.
 - Tourists: History of Thailand might attract this group.

- For international student or expats should have the brochures or any published documents in English.
- Adjust with new trends constantly
- Providing activities and temporary exhibitions for parents and children to participate in as an education zone in front of the Commerce building.
- Visitors should enjoy with the content in exhibition, hands on method. Do not require deep academic content.
- Play and Learn style could be create several of activities especially for tourists to travel to see Thais living along the Chow Phraya River.
- High technology and modern including IT system.
- Provide the learning network to the west side of Bangkok (Thonburi) by telling the way people live and the development of their society and culture especially canals side of Bangkok Noi and Bangkok Yai. Included in this is the resident of family name “Boonmark”.
- Provide the year calendar for activities and exhibition circulation in the museum also create the network with other sites on the island
- Traveling exhibits from other countries
- The international schools in Thailand have inadequate resources for the study of Thai History. Some texts but not much more. The content of exhibitions in the museum should link with the study programmes with Thai and International schools in Thailand. The content in museum should be provided in Thai and English.

Management

- Train staff to become experts in the museum profession.
- Brain storming of the theme for the museum. Design exhibition circulation for each target visitor such as students, children and families and tourists etc.
- Be able to generate the revenue, well organized and managed
- Effective marketing and public relations
- Might do a promotion such as monthly ticket for family, this will enable to checks visitor numbers.
- Lack of staff and finance may cause a development problem for the museum. This will be the weakness for museum to attract visitors.
- Recruit volunteers to the museum

- Should be considering what times and day to close and open the museum. Be able to remain open late. Generally, the high period of people to visit the museum is around the late afternoon.
- Organize a full master plan for all museums.

Partnerships: private, public organizations and communities

Partnership Network

Opportunities

- Collaborate with both private and government sectors

Recommendations to create a strong network with:

- Other museums in every region of Thailand by setting up activities or programmes in each province, this will be an advantage for other people from other provinces who visit the local museum.
- Communities in Rattanakosin Area such as Bang Lum Poo community, Fresh Market community, Grand Palace community. Expand the network towards these communities
- Both Thai and International Schools, universities, colleges in Bangkok and other provinces
- With government offices such as Bangkok Metropolitan office
- Government should be committed with the communities and society
- Offer a museum Membership
- Other museums in Bangkok

Community

- Invite the representative or the leader of each community to be involved with management of NDMI
- Study the requirements of the communities
- Inform people of the advantages of the museum so that they will assimilate the knowledge and appreciate
- Create a good relationship with the community and invite them to join as a part of this museum, otherwise this could cause function between them and Museum.
- Create the career opportunities for them.

Appendix B. Cumulative List of Interviews

The following individuals have been consulted during the preparation of the Master Plan. The list *does not* include the several dozen participants who participated in the November 17th Workshop summarized in Appendix A.

- Dr. Apinya Buasuang, Deputy Director for Educational Services and Special Events, Mahidol University
- Dr. Suwilai Premrirat, Director of the Cultural Institute, Mahidol University.
- Dr. Norashet, Lecturer, Institute of Language and Culture for Rural Development, Mahidol University
- Khun Sujitra Wutthamrong, Vice President of Administration, Children's Discovery Museum
- Dr. Charles Mehle, Director of Research (responsible for concept development and curation of the permanent exhibit), Hall of Opium
- Khun Thanakorn Palachai, the Director, Office of the President, National Science Museum.
- Khun Ginagar Chen, Foreign Affairs Division, Office of the President, National Science Museum.
- Khun Somlak Charoenpot, Executive Director, Office of National Museums, Fine Arts Department
- Khun Pichanet Sooksomchitra. Researcher and manager of product development, Tourism Authority of Thailand
- Panuwat Putpruek, Educator, Bank of Thailand Museum



