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MINNESOTA ZOOLOGICAL GARDEN

Implementation Plan 1973

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MINNESOTA ZOOLOGICAL GARDEN

Implementation Plan 1973

This study has been completed by the Minnesota Zoological Board in compliance with the instructions of the 1969 and 1971 Minnesota Legislatures and is respectfully submitted to the 1973 Minnesota Legislature for consideration.

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MINNESOTA ZOOLOGICAL BOARD

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MASTERPLAN SUPPLEMENT

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Introduction

INTRODUCTION

Need for a Minnesota Zoological Garden

In earlier times, zoos were important as the only means of showing the great variety of animal life to people with no other opportunity to view these life forms. Today, television, movies and nature centers also serve this same function. Yet the opportunity of observing animals in a first-hand way remains a unique characteristic of zoos. This empathetic experience becomes even more significant as the imbalance between man and nature becomes more pronounced.

No longer functioning as a "cabinet of natural curiosities", the Minnesota Zoological Garden becomes a mirror to the environment where the visitor experiences the animal in naturalistic surroundings with no traditional cages, sterile cubicles or bored inhabitants to mar the scene. Each exhibit is a special statement about life with its characteristic plants and animals. Such scenes gradually communicate to the visitor the interdependence of life and the life-supporting environments of our planet.

At present, over 100,000,000 zoo visits occur annually in the United States alone. Such a vast family oriented audience can become a significant factor in efforts to bring insight into man's relationship with the natural world.

At present, 290 mammals and 360 birds face immediate danger of extinction. This extinction rate is increasing at an alarming pace. Zoos have the potential to prevent or slow this rate. Were it not for them, Pere David's deer, the Hawaiian goose, American and European bison and others would already be gone. The Minnesota Zoological Garden can play a major role in this area.

The creation of captive stocks of endangered animals with the ultimate hope of reintroduction to protected natural habitats is a real hope. At least then our children can see what living Siberian tigers are like and hopefully even make a trip to view them in their natural haunts.

Even though Minnesota ranks second nationally in its quality of life, a gap exists in its family recreational potential which can be filled by a major zoological garden.

With great foresight, the legislature of the State of Minnesota has recognized the need for a major zoological garden in Minnesota. Their creation of the Minnesota Zoological Board in 1969 has made this possible. These ideas and intentions have been brought together in the following plan with the hope that funds for implementation can

Past Planning History

be provided and bring the Minnesota Zoological Garden to a reality rather than a dream.

Hopes for a metropolitan zoo have been expressed since 1955 by many groups including the Como Zoo Volunteer Committee, Minnesota Zoological Society, Citizens League, Metropolitan Council Zoo Advisory Committee and many individuals from educational, civic and youth organizations. Requests to develop a zoo were considered by the legislature in 1967 and again in 1969, when these groups asked for state support for a metropolitan zoo. The 1969 legislature was not willing to approve these plans as they stood but instead altered the scope to encompass the entire state, calling for the planning of the Minnesota Zoological Garden. This legislation expressed in the 1969 Session Laws, Chapter 868, resulted in the establishment of the State Zoological Board of eleven members appointed by the Governor with the Commissioner of Economic Development serving ex-officio.

The Board was authorized to appoint a director with qualifications in the area of zoo management and subject to its approval, the director was authorized to plan, acquire, purchase, equip, staff, operate and maintain the Minnesota Zoological Garden. Further, \$500,000 was provided to establish a working staff and hire consultants to develop a plan for the zoo. This plan, prepared by InterDesign Inc., was presented for implementing funding to the 1971 legislature.

A financial plan was proposed requesting general obligation bonding authority in the amount of \$37.4 million. This was based on a 20-year program to cover \$32 million in construction, interest and "start up" costs.

After thorough consideration, a reduced bill, calling for \$4.5 million bonding authority and \$650,000 direct appropriation to match an equal foundation grant was passed by the Senate and narrowly defeated in the House by a single vote.

Recent Planning History

Following the 1971 legislative session, the Board was provided \$150,837 through a general appropriation for fiscal 1972-73 to continue planning for the Minnesota Zoological Garden. In July 1971, the resignation of the first director, Dr. P.W. Ogilvie, was received and the former assistant director, Donald D. Bridgwater, was appointed director.

To aid in further planning, the Board immediately sought advice from state legislators in a

series of meetings. Both opponents and supporters of the proposition generously gave of their time.

Trustees of the Minnesota Zoological Society, which functions as a Citizens Advisory Committee were invited to actively assist in future planning. Further, the firms of InterDesign, Inc., Peterson, Clark and Associates, and Ehlers and Associates were retained to provide professional assistance in the areas of design, cost estimates and financial planning, respectively.

Consultants from other zoos have contributed by examining the program and providing expertise.

The current plan presented here has benefited from many consultants, but alternative plans were always the responsibility of the citizens advisory group who provided their recommendations to the Zoo Board for detailed study and final decisions. The Board assumes responsibility for the final program presented here.

Site Selection

From over 80 sites originally considered in the seven county metropolitan area, four final sites were selected. These four sites were subjected to analysis using 29 criteria with particular emphasis upon the following factors: 1. accessibility to the people of Minnesota 2. the availability of at least 400 contiguous acres 3. availability and cost of utility services 4. access 5. physical characteristics of the site and 6. ability to satisfy U. S. Department of Agriculture requirements.

After detailed analysis, the staff, Board, consultants and planners unanimously approved the 467 acre Lebanon Hills site in northern Dakota County on May 22, 1970, and this site was approved by the Metropolitan Council on June 25, 1970. The Board has, after review, renewed its affirmation of the Lebanon Hills site in 1972.

Design Plan

No zoo has ever been so thoroughly master-planned. This thoroughness was reflected in two awards given to the plan in 1971-72, including a special "Merit Award" from the American Society of Landscape Architects and an "Award" in the Nineteenth Annual Architectural Competition sponsored by Progressive Architecture Magazine. This latter "Award" is one of the highest professional distinctions which can be received for an unbuilt project.

The objectives and guidelines upon which the plan is based have been carefully reviewed and were unanimously retained by the State

Zoological Board in developing the revised Minnesota Zoological Garden program.

The primary objective of the plan calls for a public recreation and education facility featuring naturalistic displays of animals in which the visitor is introduced into the animal's environment rather than forcing the animal into a "people" environment. The facility will be operated year-round, with educational, conservational and research potential integrated into each exhibit. A statewide education program will encompass all age groups. Areas are set aside to encourage the propagation of one or more endangered species appropriate to this climate.

The zoo is designed to generate income adequate for its successful operation and expansion.

Further, the animals will be exhibited by geographic region rather than grouped by like-kind and will be exhibited to emphasize the quality of single exhibits rather than quantity of exhibits. The animals must appear as free as possible with exhibits emphasizing natural social groups rather than numbers of kinds of animals. As much as possible, landform and landscape must remain unaltered.

In order to achieve these goals, an intensive design study of the site was made including hydrology, micro-climate, soils, visual form and land analysis. The results of these evaluations were applied to the development of solutions for site access, surrounding land use, graphics and communications; internal services, vehicular and pedestrian circulation, parking, transportation, water use, storm and sanitary sewers, waste treatment, drainage, utilities and utilities distribution, landscaping, lighting, exhibits and main building complex.

Program Changes

Program Changes

PROGRAM CHANGES

While retaining the objectives, guidelines and design solutions which had led to the Minnesota Zoological Garden plan, transportation, parking, exhibits and the main building complex have been revised. Changes in these areas made possible general reduction in utilities, site development and circulation costs. This was done in an effort to reduce the initial implementation costs and annual operating costs without altering the zoo's philosophy, quality and attractiveness as a major educational-recreational facility for Minnesota's citizens and guests.

Those areas in which changes were made are as follows:

Northern Animals Exhibit and Transport System

Originally, a Northern Trek was designed with 17 special exhibits of northern climate animals and exhibits sequenced to simulate a 9,000 mile journey from Scandinavia, across northern Europe and Asia, to North America, terminating in Minnesota. The entire trek was accomplished via a 3.5 mile monorail traveling in, around and through the exhibits, with a mid-point stopover featuring the animals and ecology of the Bering Straits.

Twelve of these spectacular northern animal exhibits have been retained. These are located closer to the main building complex, but retain a sequential viewing philosophy. The \$5,000,000 monorail system has been eliminated and in its place, a system of walkways and overlooks covering slightly over one mile has been designed. These walkways are designed to accommodate an inexpensive trackless train system.

The Farm

This exhibit was design to represent a typical Minnesota farm of the 1880's. Continuous farm activities, seasonally appropriate, were planned, and a children's contact area for animal petting provided.

This exhibit has been eliminated and replaced by an interpretive center featuring an opportunity for interaction between visitors and animals in a controlled setting, an animal nursery, theater-in-the-round and a touch, feel and see hall.

Oriental Tropics

This spectacular segment of tropical rain forest, featuring animals of the oriental region, has been retained with small additions to the work and utilities space.

Whale Exhibit

Comprising a large aquatic pool of beluga whales, this exhibit has been retained and ex-

panded to include four small northern arctic aquaria displays.

Minnesota Exhibits

The Minnesota area originally contained 15 exhibits of Minnesota animals. Its area has been expanded to include the potential for exhibiting representatives of all native vertebrates amenable to captivity, and includes a spectacular walk-through aviary.

Entry-Orientation Complex

Functioning as the main entrance to the zoo, it features special orientation exhibits, restaurant, shops, and other public services. After careful study, the structure has been reduced approximately 30 percent in size, but adequately retains all its original functions.

Education and Administration

By combination of overlapping functions within the interpretive center, the education complex has been functionally related to the interpretive center with some reduction in space.

Changes in the organizational staffing of the zoo, reflecting a smaller administrative staff and the relocation of some administrative functions have resulted in reduced space requirements.

Utilities, Site Development and Site Circulation

Consistent with a more centralized northern animals exhibit, and reduction in the main building complex, site work, utilities, primary power and water requirements have been substantially reduced. This is also true of internal roadways. The peripheral surveillance road will be graded and stabilized rather than hard surfaced.

Parking for 6,000 vehicles (4,000 hard surfaced spaces and 2,000 seasonally surfaced) has been reduced to 2,000 hard surfaced and 2,000 seasonally surfaced spaces.

It is felt that plan changes, while reducing the total cost, have resulted in a more functional, centralized zoo with a broadened series of animal exhibits and a sound, practical foundation on which to base future development.

Design Components

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DESIGN COMPONENTS

Entry Orientation Complex

Although basically remaining as originally planned, there is a greater emphasis on special exhibits such as small aviaries, plantings and graphics displays. In addition, the overall building size has been reduced.

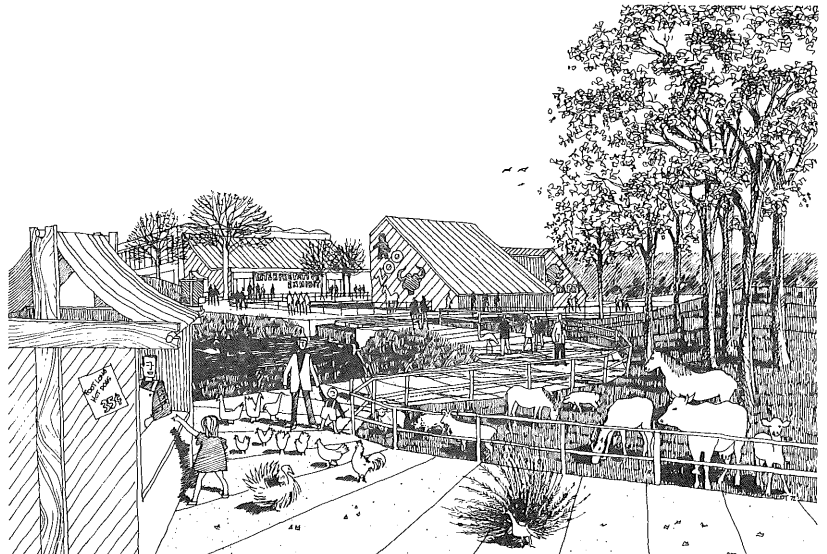
Leaving behind the rush of traffic, entry to the zoo is through plant bordered walks from a large central grass-covered hill overlooking a central lake.

At the mezzanine level, displays will supply basic directory information. Moving down to the concourse, a series of special orientation displays will direct the visitor toward the main zoo exhibits or lead to a restaurant offering snacks or complete meals, overlooking the central lake. Here, special services such as stroller rentals, gift and film bars, lost and found, and parcel checking are available.

From here visitors can choose to see exhibits in climate-controlled comfort regardless of season, or experience outdoor walks. Surrounding the entry are picnic areas, strolling terraces and rest areas permitting views of the lake and interior zoo areas.

Interpretive Center

Replacing the 1880's farm, this special area will provide still more intimate rapport between the visitor and the zoo residents. Located near the entry, it features a complete animal nursery center. Here infant animals in need of special raising will be cared for. Incubators will hatch bird and reptile eggs - all this in view of the visitor through special one-way glass. A children's contact area will feature a small willow-shrouded pond sheltering waterfowl eager to receive attention. A carefully



The interpretive center.

designed area will allow children the opportunity to pet and feed small domestic animals under close supervision. Pathways lead to a touch, feel and see center where the visitor can examine a wasp nest, lift an ostrich egg, or watch a chameleon change color.

Central to its theme, a small theater-in-the-round features hourly programs where zoo animals are introduced to the visitor with the opportunity for questions and answers. Both adults and children will leave with a greater understanding of themselves and their fellow creatures.

Northern Animals

Some of the most exotic and spectacular animals exist in climates far more rigorous than that of central Minnesota. A decision to take advantage of our climate rather than resist it, has resulted in this special exhibit of northern climate animals who not only tolerate but thrive in sub-zero snowy environments. Retaining twelve spectacular exhibits of the original Northern Trek, it features animals from northern Japan, Siberia, Alaska, Canada and Minnesota.

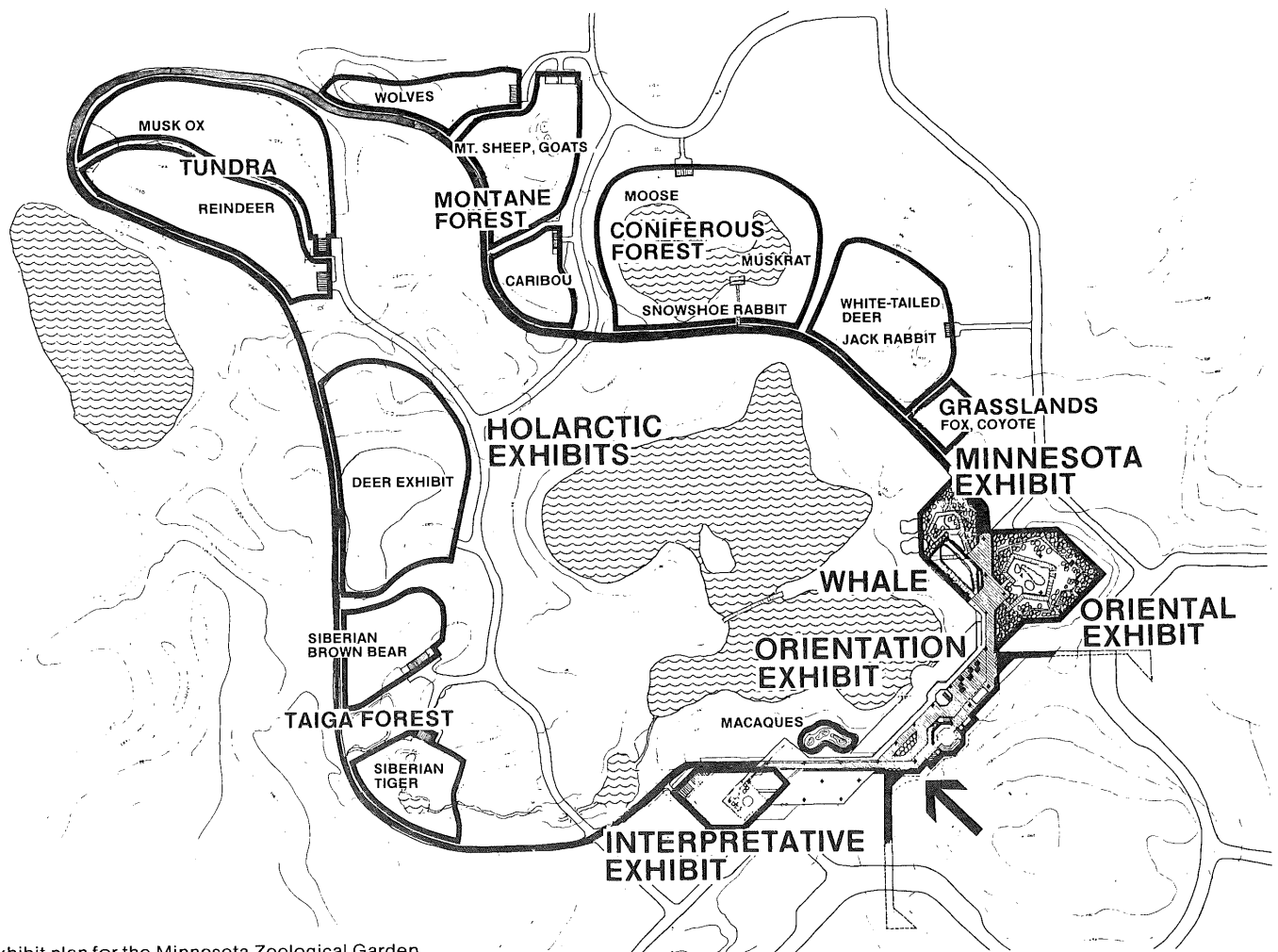


Exhibit plan for the Minnesota Zoological Garden.



Containment of the animals through the use of unobtrusive barriers will give a feeling of freedom to the visitor as illustrated in this view of the Siberian Tiger exhibit.

The exhibits are connected by a series of pedestrian walkways featuring overlooks and rest areas. The walkway system is designed to accommodate a simple trackless vehicle system for the convenience of the visitor. The visitor will be spellbound by the view of a musk-ox herd displayed on a seemingly vast arctic tundra. Behind them a wolf pack in sight of their natural prey will be visible yet separated by an invisible moat, creating a cross-section of arctic life.

Moose will stand with steamy breath under a planting of conifers and Siberian tigers will break the ice for a swim or leap ledges to receive food. Mountain goats will dazzle the visitor with unbelievable footwork along precipitous ledges.

The use of moats, hidden fences and careful use of planting and land form will create the open uncaged freedom so necessary to these large animals.

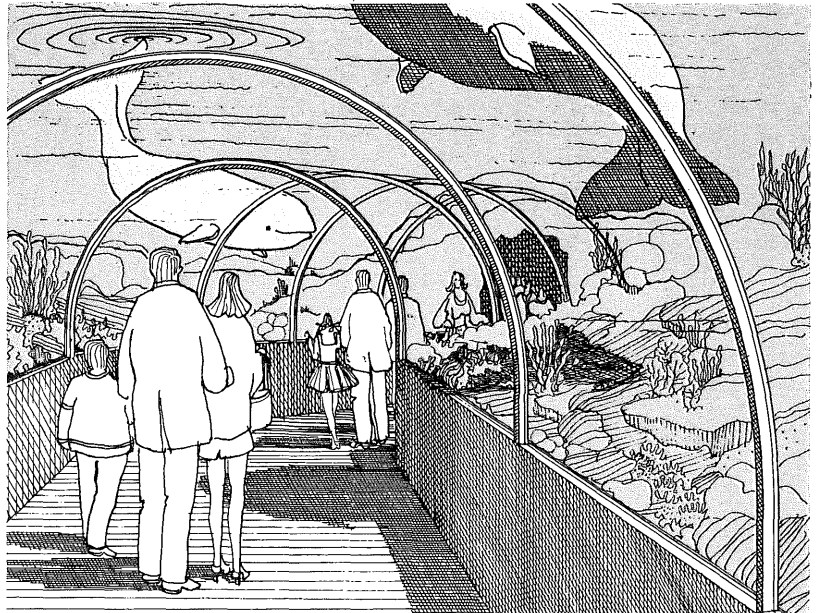
Near the zoo entry a troop of Japanese snow monkeys will entertain the visitor winter and summer. All the while these animals will be part of a captive conservation program in a zoo willing to specialize in their exhibition



Winter view of the Japanese Macaque exhibit.

Whale Exhibit

Beluga whales will cavort in a specially designed aquarium approximately 5,000 square feet in size, allowing plenty of room to swim, dive or porpoise at the surface. The visitor may watch from above or below water and even traverse a tunnel through the center of the whale's environment.



Visitor will experience the world of the whale in this specially designed tunnel.

Special hydrophones will allow the visitor to "listen in" to the whales conversations, and graphics will interpret these sounds.

Four nearby refrigerated aquaria will feature many of the multicolored starfish, sea anemones and crabs of the North Arctic waters.

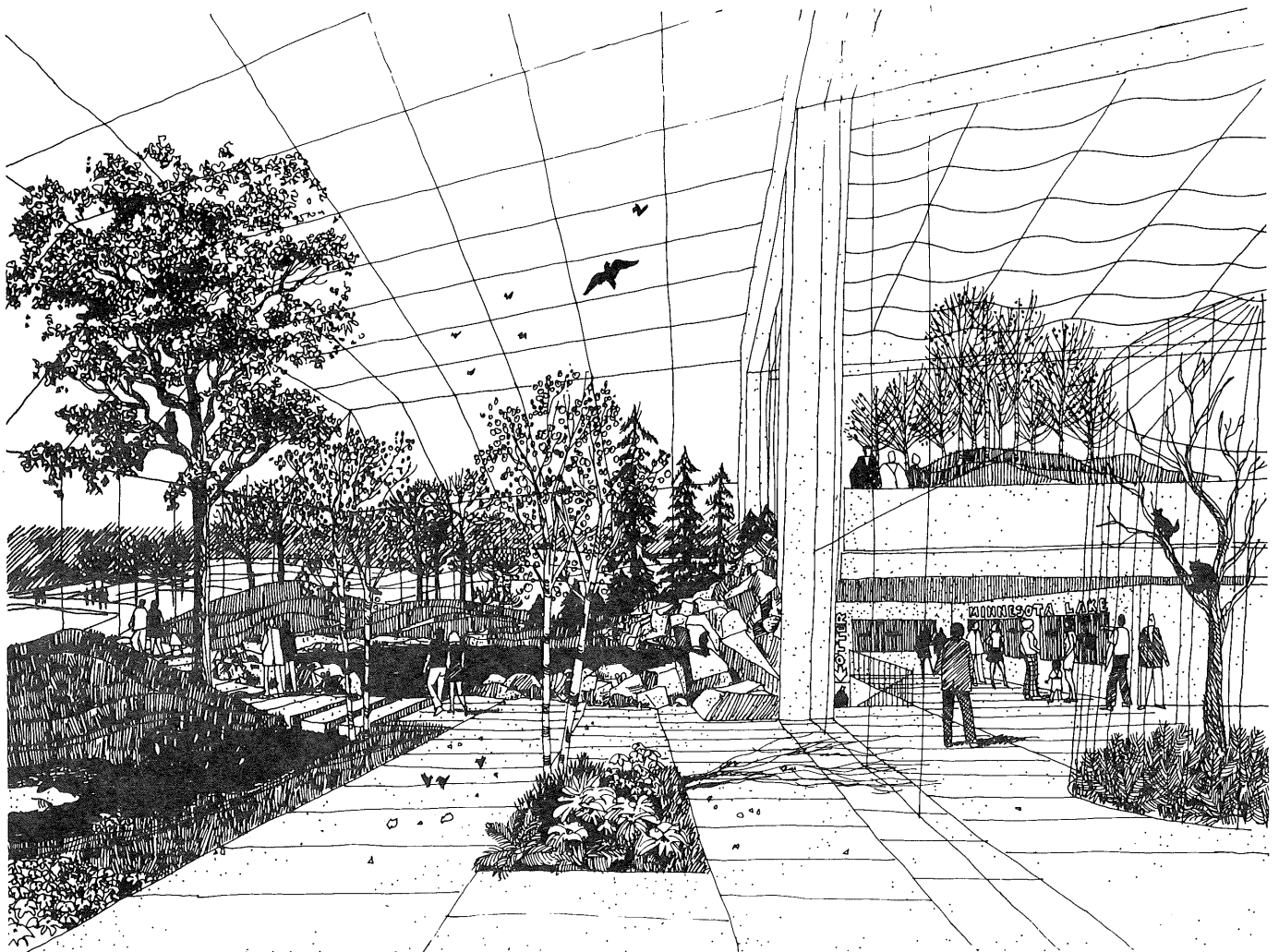
Primary pedestrian circulation is independent of the other exhibits, with the entire area climate-controlled for winter viewing.

Minnesota Exhibit

This exhibit is based on an exciting naturalistic display featuring the animals of Minnesota. Some 75 mammals, 45 reptiles, 30 fish and amphibians and over 100 kinds of birds will be shown. Exhibits include a walk-through tank depicting a Minnesota lake filled with compatible fish, turtles, frogs and snakes, a walk-through free-flight aviary, and naturalistic displays of otter and beaver. Paths lead the viewer over, around, under and through interior displays. Outside, moose will wade in a spacious enclosed bog and chipmunks, woodchuck and squirrels will clamber over ledges and trees, free to come and go at will, as are the ducks, geese and swans on the lake.

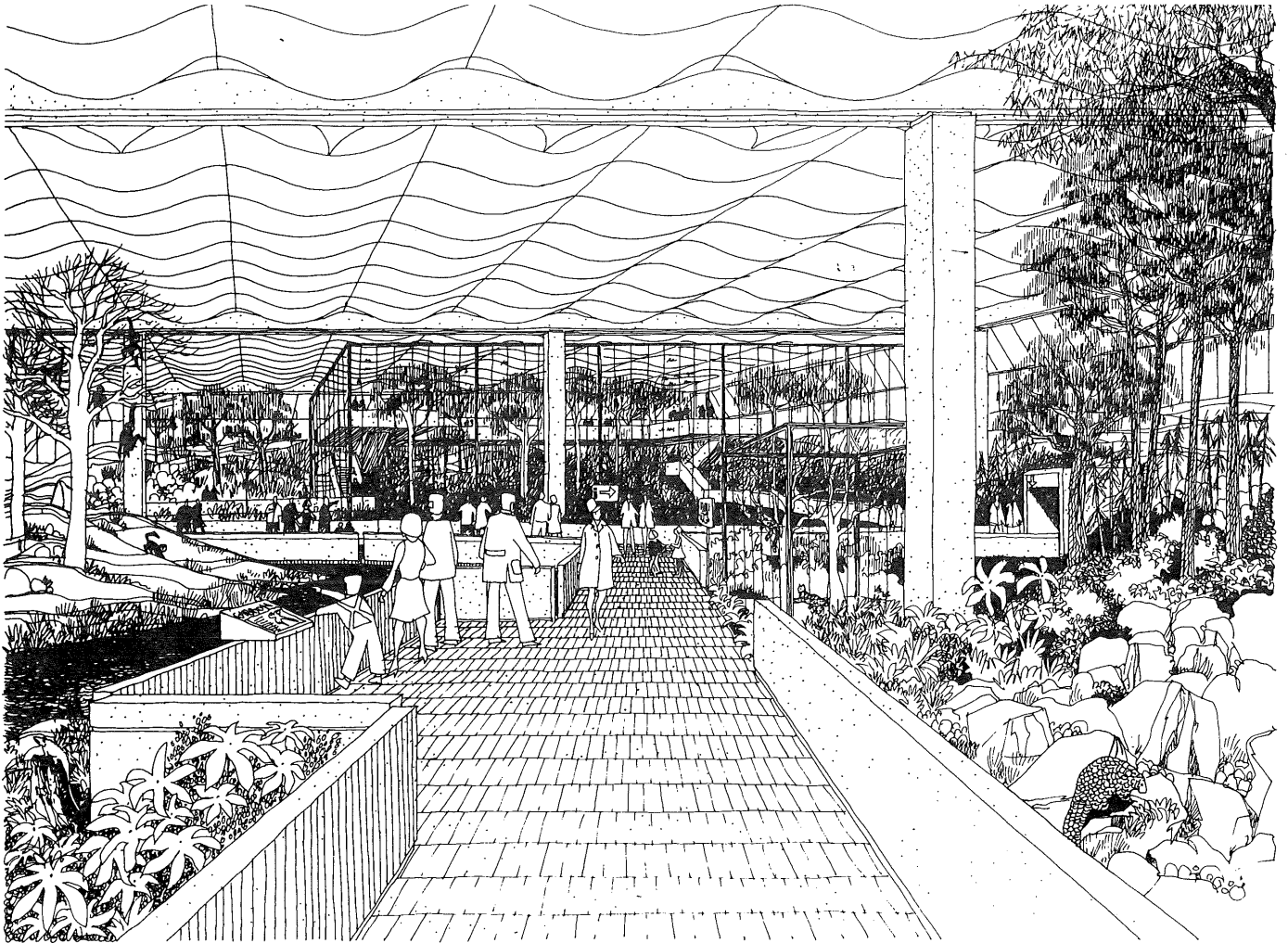
Special T.V. cameras will allow the visitor to peek into the little known world of the beavers' dam or the pygmy shrews' tunnel. With interior exhibits enclosed under a translucent roof, this exhibit becomes open to the visitor on a year-round basis.

View of the Minnesota exhibit including Otter, Beaver and Aviary.



Oriental Exhibit

The Oriental exhibit is a segment of tropical rainforest which is climate-controlled and enclosed under a translucent roof. Visitors enter the exhibit from the main concourse and diverge on multi-level pathways into a conservatory of plants and animals. Through breaks in the vegetation, animal life will appear... tapirs swimming in a jungle pool, pangolins probing a rotted log for food, fruit bats hanging high in a tree.



A pool featuring fresh-water porpoises and a central island containing white-cheeked gibbons, demonstrating their aerial artistry and distinctive calls, are featured. Fully one-third of this space is devoted to a series of free-flight habitats containing brilliantly-colored tropical birds. Special cloud-making equipment will create a fog bank penetrated by a pathway leading the visitor to a simulated high altitude bamboo forest. In every case, the exhibits enable the zoo to present the animals engaging in part of their normal life style rather than sleeping in dull cages or residing on cramped perches.

Internal Services

Representing the functional base for the zoo, this complex is located in the northeast corner of the site, visually separated from the main zoo, but convenient to all areas. All zoo employees will enter through this area as will all service and delivery vehicles, thus keeping unnecessary or unofficial traffic from the main zoo area.

There are three major functional areas:

1. animal services including a hospital, research area, quarantine facilities and keeper facilities;
2. shipping, receiving, and commissary;
3. maintenance and operations, including shops, building materials storage and power plant.

Physical separation of these facilities to control noise, dirt, disease transfer and employee circulation is carefully worked out.

Administration and Education

Occupying the western wing of the main building, this complex has been carefully designed to eliminate overlapping functions.

Functionally related with the interpretive center, the education area contains four youth and adult classrooms with laboratory facilities as well as a small library and reading room.

Although education programs make use of the entire zoo, this area is equipped to receive all special groups via a separate entrance and is used as a base for all special education programs.

Here also are the photo labs, sign and print shops which support the graphics and publications program for the zoo. On a lower level, storage facilities are provided for zoomobiles, animal care facilities and work space.

Cost Analysis

PROJECT COST ANALYSIS

Preliminary cost estimates have been based on the proposed preliminary design for the exhibits and facilities of the Minnesota Zoological Garden described in this report. Estimates reflect existing site conditions and have been developed for the construction work components that comprise each category of construction. Estimates are based upon 1972 costs; escalation factors have been applied separately.

Calculations for site work were computed by considering the following items: topographic work at contour intervals, linear cross-section center line profiles, acres of clearing for various tree sizes, utility center lines, profile exhibit barriers, barns and dens. Particular consideration was given to aquaria, filter systems and special exhibit effects. Schematic development of building plans, sections and elevations was reviewed on a square foot basis with regard to appropriate materials and construction techniques. Preliminary engineering, design of road profiles, utilities, hydrology, heating, cooling and power distributions, earth-moving, clearing and elements of circulation were examined and analyzed by construction quantities and unit-cost breakdowns. The costs of structures are based on square foot areas taken from preliminary design multiplied by appropriate unit cost costs with special consideration for unique materials or construction techniques.

These studies have all been re-evaluated and subjected to a prudent cost escalation factor necessary in any construction project to be phased over several years. This factor is derived from a composite cost index utilizing the combined ten-year records of five construction indexes, considered standard for the industry. The resulting composite index indicated a cost escalation factor of \$3,109,700 through the end of 1974. It is anticipated that during this period design work and all construction contracts can be let for completion of the project. However, such escalation cost estimates are at best empirical and require constant reassessment as actual construction costs can be verified. A program has been designed to compensate for such factors as time delays or cost escalations in excess of projections. It calls for the use of earnings from investment of unused bond funds.

The allowance for fees and contingencies of \$2,947,800 was exempted from the cost escalation computation. A \$1,000,000 item for equipment, animal acquisition, and machinery is not

normally covered in construction contracts. It was exempted from fee computations, but includes cost escalation on individual items as estimated by suppliers.

The total project costs of \$23,686,900 (23.7 million) represents a reduction of \$8,313,100 from the 1971 legislative proposal of \$32,000,000. These reductions are reflected in the preceeding description of program changes.

Project Cost Analysis

CONSTRUCTION COSTS		\$ 16,629,400
Major Exhibit Areas:		\$ 7,664,331
Orientation Theater and Exhibits	\$ 820,080	
Northern Animals	1,018,266	
Minnesota Exhibit	1,047,880	
Whale and Aquaria	933,980	
Oriental Exhibit	3,046,825	
Interpretive Center	797,300	
Public Facilities:		2,619,700
Entry and Orientation		
Circulation, Terraces and Ramps		
Shops and Restaurant		
Mechanical Spaces		
Support Facilities:		2,407,846
Internal Services	2,111,706	
Operations and Maintenance		
Animal Health and Research		
Service Corridor	296,140	
Site Circulation:		1,063,826
Utilities:		2,009,196
Water Supply and Distribution	281,333	
Storm Sewer	79,730	
Sanitary Sewer and Lift Station	261,970	
Electrical Power and Distribution	646,952	
Gas Distribution	33,031	
Communication Network	34,170	
Central Heating	672,010	
Site Development:		864,501
Perimeter Fencing	261,970	
Planting and Landscaping	91,120	
Nature Trails and Picnic	11,390	
Sodding and Seeding	67,201	
Rough Grading	205,020	
Graphics	91,120	
Displays	136,680	
EQUIPMENT AND INVENTORY		1,000,000
FEES AND CONTINGENCY		2,947,800
COST ESCALATION		3,109,700
TOTAL PROJECT COSTS		\$ 23,686,900

Implementation Schedule

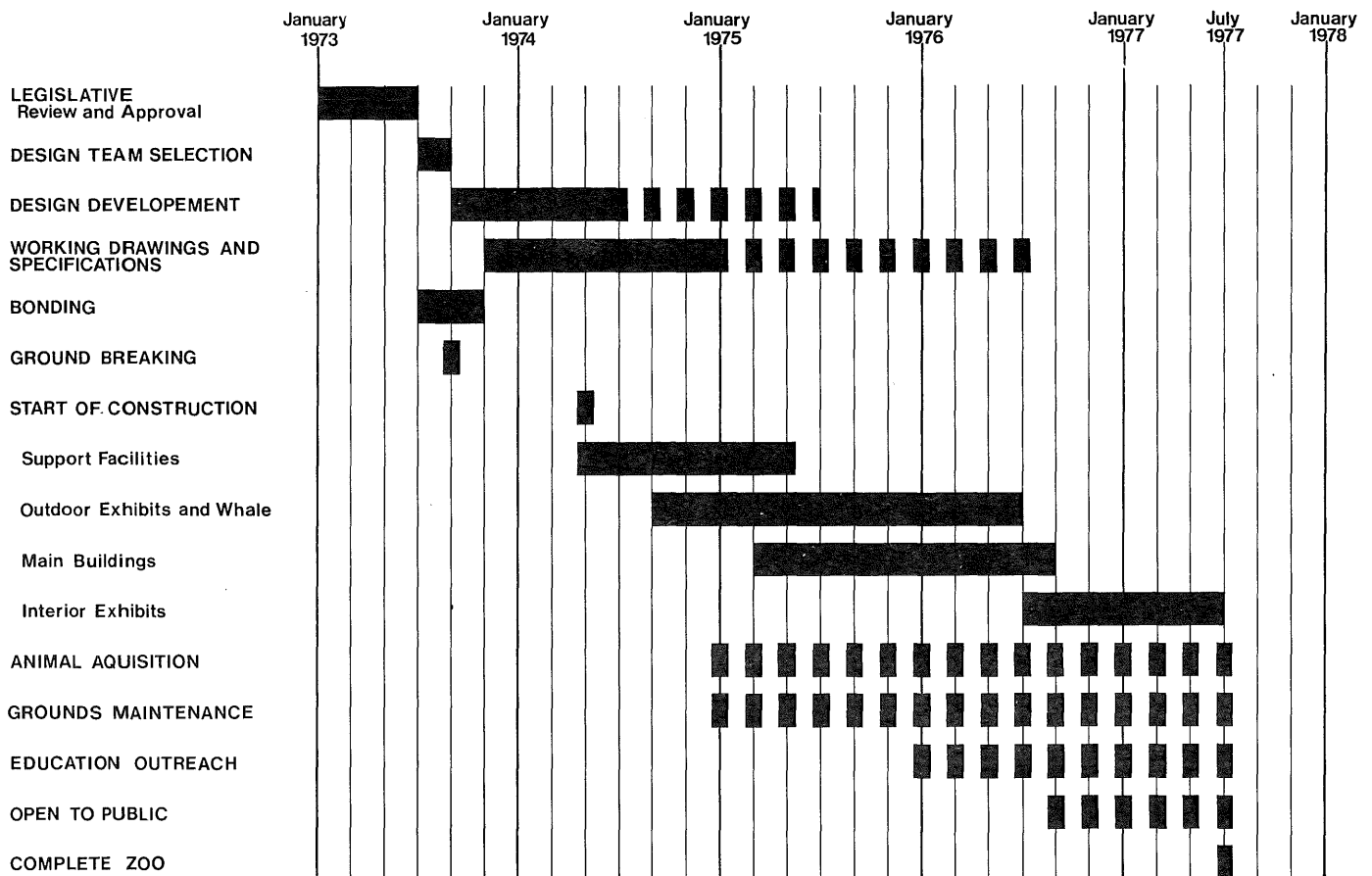
Assuming favorable action by the legislature, the Minnesota Zoological Garden could be substantially open by July, 1976, and fully completed in July, 1977. Achievement of these goals, however, requires that both land accessibility and funding arrangements be completed in 1973.

After funding, approximately one year will be required before construction contracts can be let. Through careful project management and scheduling, site and utilities work can begin in April, 1974 before all design development is complete.

The completion of animal holding facilities, shops and hospital by April, 1975 will allow a basic program of animal acquisition and grounds development to begin in early 1975.

Construction of outdoor exhibits, interpretive center and the whale exhibit will begin in the fall of 1974 so that by July, 1976, these exhibits can be opened to the public.

By this time, the basic main building construction will be complete allowing a full year to develop the complex interior exhibits, displays and graphics. The zoo will be fully complete in July, 1977.



**Staffing, Administration and
Operating Expense**

The operation of the zoo by authorizing legis-
lation is administrated by an eleven member
board, appointed by the Governor and directed
by its chief administrative officer, the director.
Further staff organization is dictated by log-
ical divisions of operational zoo functions

The three major areas of zoo function include
animal services, physical plant operation and
educational-information. Administrative ser-
vices, including planning, budget and public
services have been assigned to the director's
office. An assistant director will be in charge
of animal services including animal care, health
and research. Physical plant operations and
grounds maintenance will be the responsibility
of the physical plant superintendent while ed-
ucation-information will be directed by the
Curator of Education.

Staffing of the zoo has been carefully coordin-
ated to functional demands as design, construc-
tion, and operational components are added
leading to a fully operational employee compli-
ment of 156 in 1977. Additional staff reflecting
major additions to the facility in future years
are not included as such expansions are depen-
dent upon growth, and accessory grants in aid
which are impossible to anticipate.

ANTICIPATED EMPLOYEE COMPLIMENT BY FUNCTION & FISCAL YEAR

<u>YEAR</u>	<u>72-73</u>	<u>73-74</u>	<u>74-75</u>	<u>75-76</u>	<u>76-77</u>	<u>77-78</u>	<u>78-79</u>
Management	1	2	3	5	5	5	5
Professional and Technical	1	4	8	17	18	19	19
Clerical	1	3	4	10	10	13	14
Labor and Service	0	0	19	53	83	109	118
TOTAL NUMBER	3	9	34	85	116	146	156

Operating Expenses (1977)

Operating expenses have been calculated from examination of the accounts and budgets of other major zoos with consideration given to wage scales and availability and costs of goods and facilities in Minnesota. The estimate includes appropriate allowances for maintenance of grounds and buildings as well as depreciation of equipment.

Increases in operating expenses are related to attendance growth estimates over the years. This was done by deriving relationships between the costs of operation as a function of zoo attendance for other zoos analyzed. This relationship implies that operational costs are a function of the number of zoo visitors, roughly \$1.00 per visit. All estimates after 1978 do not consider inflationary effects in either income or expenses.

Total Operating Budget \$1,826,269 (1977)

Personnel and Administration	\$1,451,484
Animal Support	60,000
Maintenance	122,785
Utilities and Services	70,000
Operating Supplies and Services	35,000
Travel and Transportation	37,000
Promotion	50,000
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TOTAL	\$1,826,269

Financial Program

FINANCIAL PROGRAM

Attendance

The basic estimate of attendance for the Minnesota Zoological Garden is 1,741,000 for the first full year of operation in 1977-78. This figure has been derived by evaluating visitor generation factors for other zoos (the number of visits per 1,000 population) having similar gate charges. Based on these evaluation a figure of 820 visits per 1,000 metropolitan population is assumed. The revised Metropolitan Council Metropolitan Area population projection of 2,123,292 in 1977-78 is used as a base. This yields an estimate of 1,741,000 visits in 1977-78. Although indications suggest a ratio of one visit per unit of metropolitan population, the more conservative figure was assumed to allow for a free admission policy with regard to school groups and selected free admission days throughout the year. This annual attendance figure was allowed to increase at 1.9 percent annually to the year 1996 in direct proportion to population increase projections.

A ratio of adults to children is established of 65:35 with an adult defined as any visitor above the age of 12.

Revenues

An admissions policy has been established calling for a general admission charge of \$2.00 for adults and \$.50 for children. Organized school age groups will be admitted free of charge. In addition, a policy of 4 percent free admissions has been established allowing for certain days to be free days throughout the year. At these times, no gate charges will be applied.

Revenue factors include an allowance for parking at the rate of \$1.00 per vehicle. With 3.5 persons per vehicle and allowing a 12 percent factor for public transportation and free bus parking, this income will amount to \$.25 per visitor.

Estimated net income from concessions based on an evaluation of records from other zoo operations has been established at \$.22 per visit.

Revenues which may accrue from ancillary developments such as motel or service station leases, donations, animal sales or trades and the operation of a seasonal trackless train have not been included.

Financial support which may accrue from a supporting zoological society has not been included.

In addition a direct 4 percent sales tax on both admissions and concessions will accrue to the state. This will amount to \$2.4 million during the 20 year bond financed period.

Besides revenues spent directly at the zoo, additional monies spent elsewhere by the zoo visitor will produce income which will accrue to the State of Minnesota and its citizens.

Financing

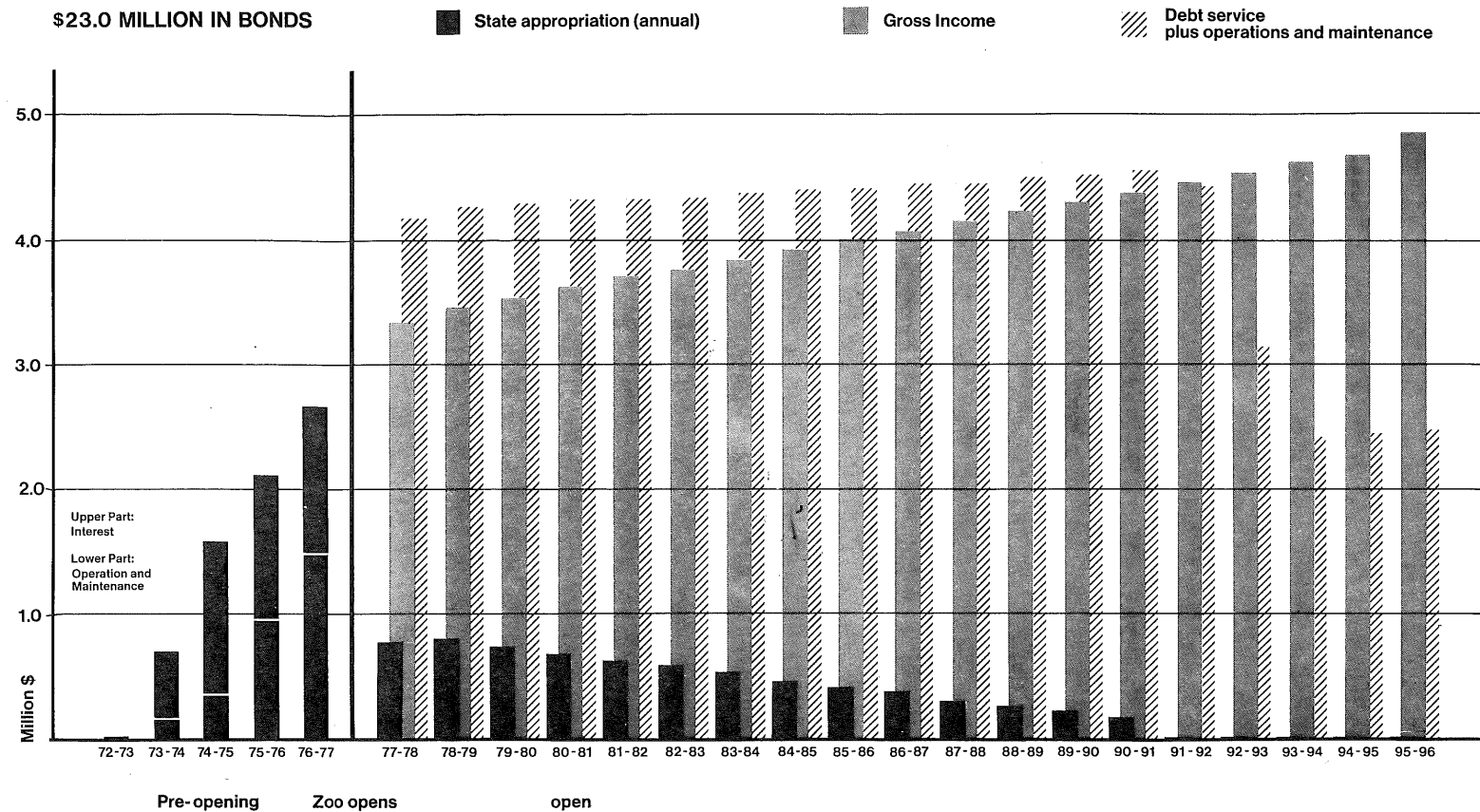
In developing a finance plan, the Board has used the attendance figures, admissions policies and revenue factors presented in this report to calculate gross annual income. It has additionally accepted the premise that after opening the annual costs of operations and maintenance and capital improvements program shall not be the state's responsibility, rather, the zoo must be operationally self-supporting. It is also assumed that admission charges could not be elevated above the \$2.00 adult and \$.50 child admission level. Under these restrictions, two alternative financing plans seem most prudent, both plans calling for complete funding of the zoo in one stage to offset rising inflation factors. In both cases, the Board is asking the state to share in start-up costs and retirement of indebtedness.

The finance plans for the zoo call for bonding programs based on 20 year general obligation revenue bonds which will be sold to finance the \$23.7 million project costs. In both plans all proceeds from the short term reinvestment of available bond funds and/or accumulated reserves have been applied to the Minnesota Zoological Garden accounts.

\$23.025 million program. The zoo is asking for a direct appropriation for pre-opening operations and maintenance costs as follows:

\$168,785	in	1973-74
\$326,109	in	1974-75
\$959,827	in	1975-76
\$1,495,827	in	1976-77

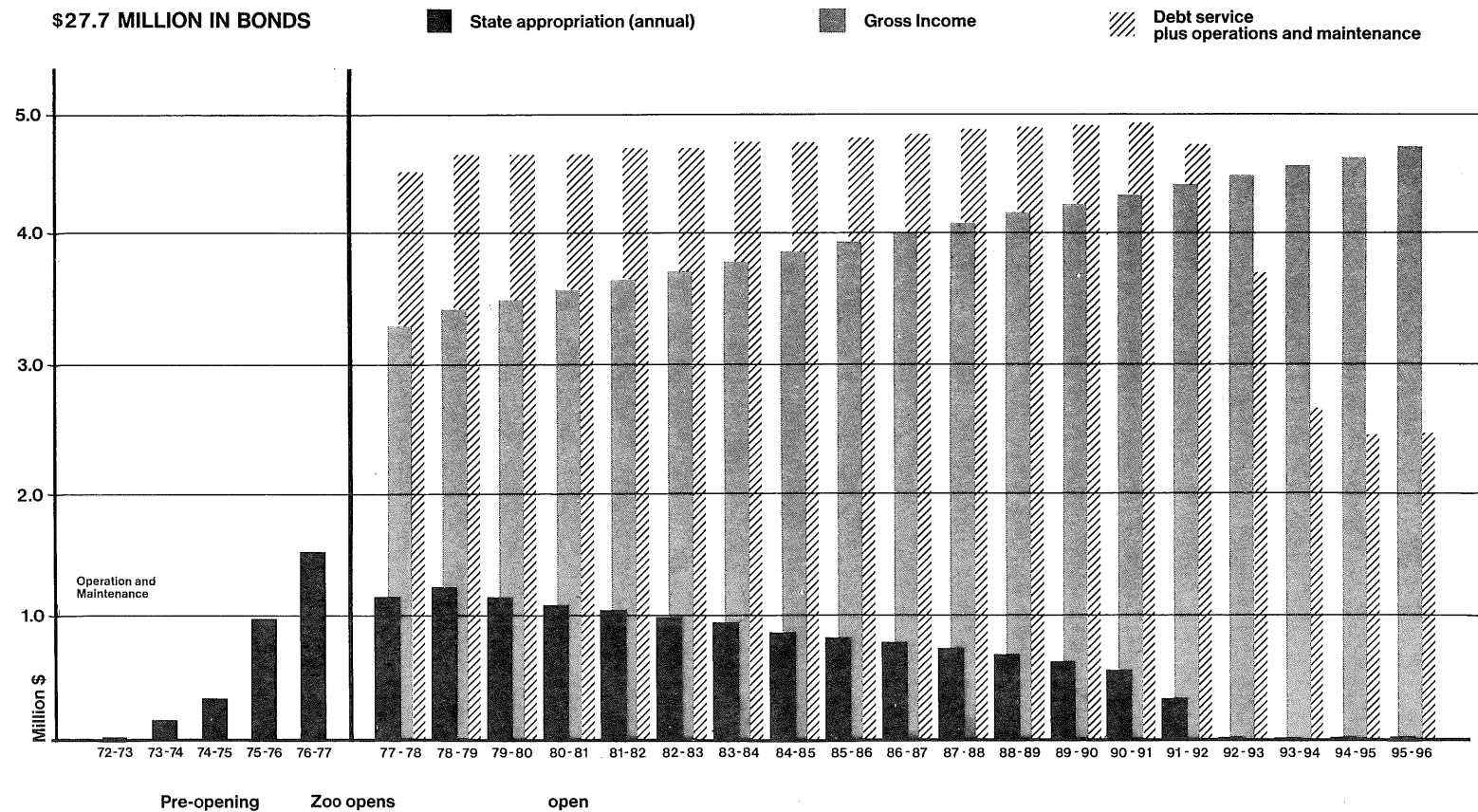
In addition, payments of interest only on the bonds prior to the first full year's operation will be required from 1973-74 through 1976-77 in the amount of \$3,983,750. From 1977-78 onward, zoo revenues over and above annual operating costs will be applied toward the retirement of principal and interest with the state contributing the balance. The state's share is \$6,921,853 (last payment 1991); the zoo's share is \$26,568,147. After 1992 capital reserves would accumulate to \$8,614,463 in 1995-96. Total costs of the project including pre-opening expenses through retirement of the debt, would be \$40,424,300, of which the state's share will be \$13,856,153, the zoo funding 66 percent of the cost.



\$27.700 million program. Pre-opening operation and maintenance costs would be as described earlier. However, pre-opening bond interest would be capitalized* paid from the bonding funds.

Beginning in 1977-78, the amount of zoo revenues over and above operations is applied to the debt retirement with the state asked to supply the balance. The state's share is \$13,083,943 (last payment 1992). The zoo's share is \$27,447,307. After 1993 capital reserves would accumulate to \$7,262,726 in 1995-96

Total costs of the project (including pre-opening expenses) through retirement of the indebtedness is \$48,286,800, of which the state's share will be \$16,034,493, the zoo carrying 67 percent of this cost.



* Interest payments on bonds issued during the first four years, which interest is to be paid from an increase in the total amount of the bonds issued rather than from operating income during the first four years.

Applying the 4 percent sales tax that will accrue on taxable revenues (\$2,368,796) against the cost of the state's share, the total outlay for the state on the \$23.025 million program is \$11,487,357, and for the \$27.700 million program a total of \$13,665,697.

It is felt that the program is both sound and realistic. No expenditures for possible new construction or major zoo additions in future years are included. It is assumed that such expansion would be financed out of zoo growth providing additional earnings, from private benefactors, and grants in aid.

It is probable that the zoo can be substantially open in July, 1976 (the exception being interior exhibits of major building). However, no assumptions of income from such an early opening have been made.