2-2 MODEL DESIGN OF SHUTTLE BUS SYSTEM

Outline of Shuttle Bus System

The main esplanade, 1.5 km. long, with the pedestrian deck on it, is located on the basic composition axis of the new governmental and business center of Astana City. Since there will be plenty of offices, hotels, customer services etc., it is urgently necessary to solve the problem of transportation of lots of people at a long distance.

The present model design –shuttle bus system is proposed to solve the problem of transportation of people.

Adaptation of shuttle bus system in this area is dictated by the following requirements:

(1) necessity of transportation of lots of people at a long distance;

(2) necessity of limitation of ordinary traffic;

(3) necessity to implement environmentally appropriate technology in the central part of the city, where it is expected to have a great number of people and traffic;

(4) necessity to provide with maximum comfort while transporting people of all ages and invalids in the conditions of severe climate.

Hence, this model design proposes the following decisions:

(1) use of special shuttle bus with low boarding ramps, operated on electricity and gas;

(2) the route clockwise along the perimeter of the pedestrian deck with stops in every 350 meters and traffic intervals of 15 minutes;

(3) arrangement of bus stops, adjacent to the pedestrian deck and protected from precipitation by transparent sheds;

(4) equipment of buses with special devices, making getting in and out easier for elderly people, invalids and children.

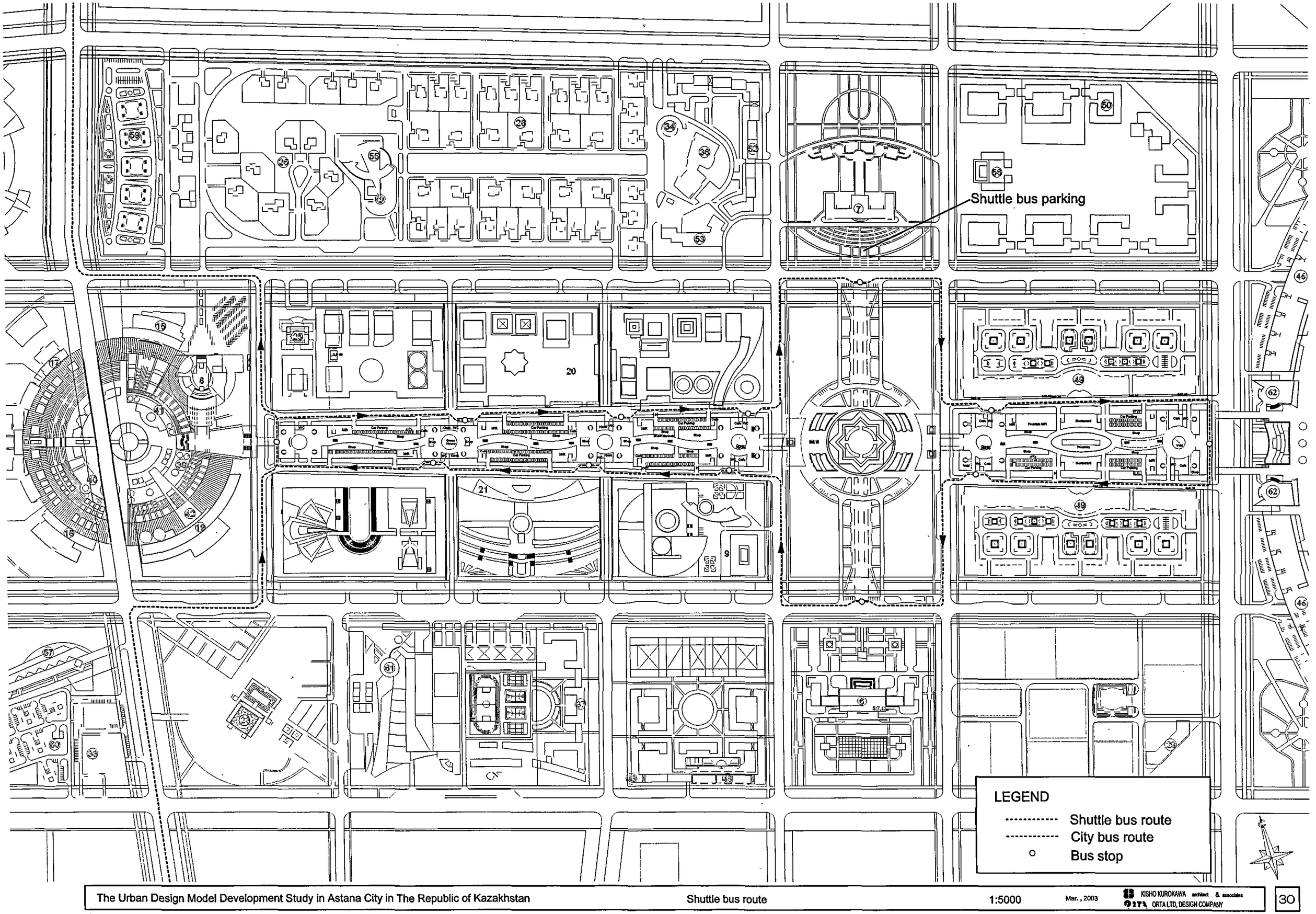
For maintenance works and keeping of shuttle bus, it is proposed to arrange special bus parking, located in the northern part of the New Center. The location of the bus fleet is shown on the situational scheme (location map). The bus fleet should be designed according to the type of exploitable shuttle bus.

<Specification figures of bus-shuttle system>

General length of the route - 4 230 m

Number of bus stops - 12

Distance from the nearest route point to the bus fleet - 800 m



The Urban Design Model Development Study in Astana City in The Republic of Kazakhstan

Shuttle bus route

1:5000

Mar. , 2003

KISHO KUROKAWA architect & associates
ORTA LTD, DESIGN COMPANY

ВЫПОЛНИЛ
ПРОФ. А.Ч.

Poplar tower

pavilion-shuttle stop B

pavilion-shuttle stop A (final stops)

(fragment) O

SCHEME OF BUS STOPS LOCATION

pavilion-shuttle stop type B

pavilion-shuttle stop type A

1

manhole for snow

bus stop platform

tambour

6⁴⁰–9⁰⁰

6⁴⁰–9⁰⁰

d area

entrance and exit

pavement

transportation

Scheme of pavilion type B (fragment) O

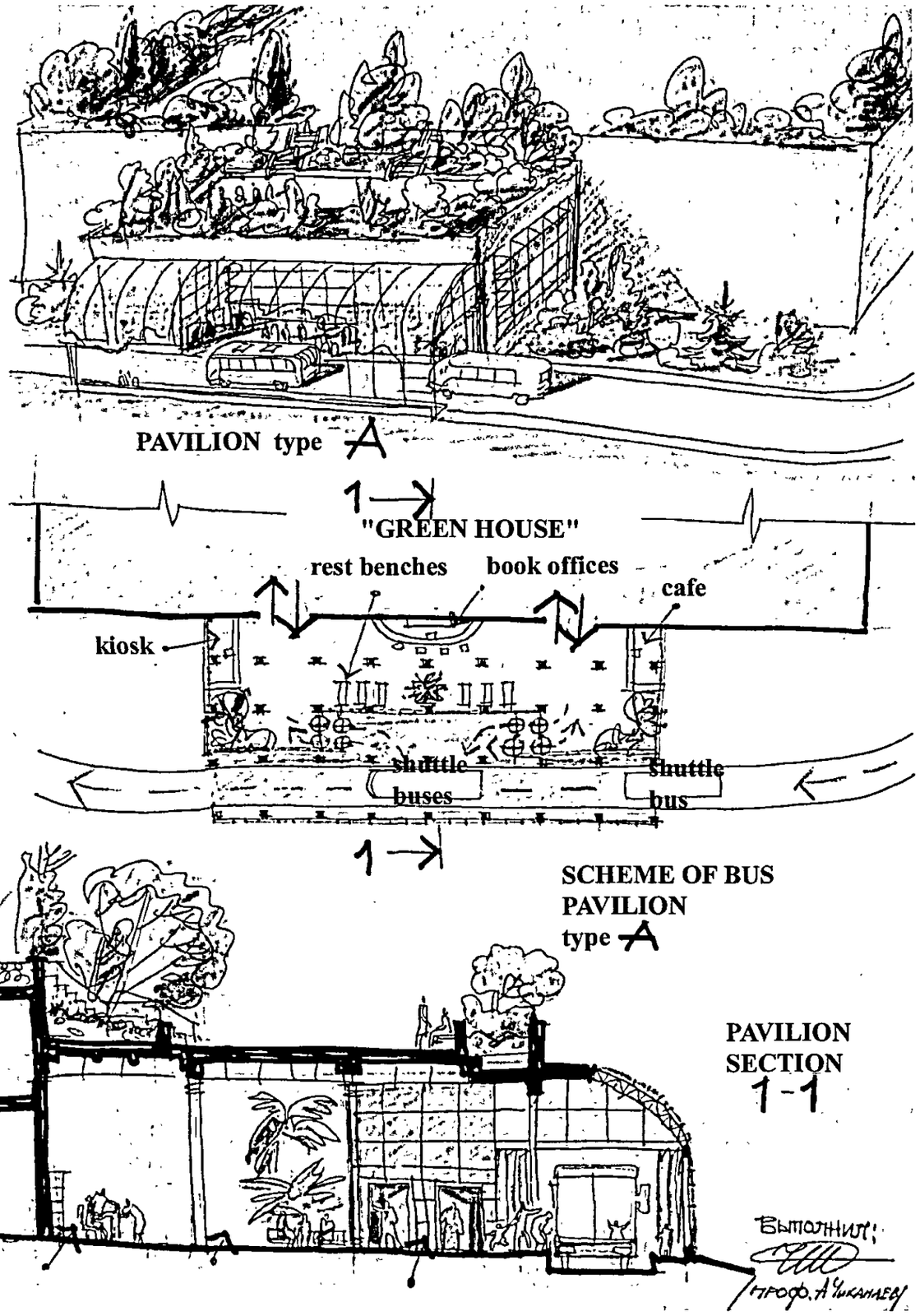
Section of pavilion 1-1 type B

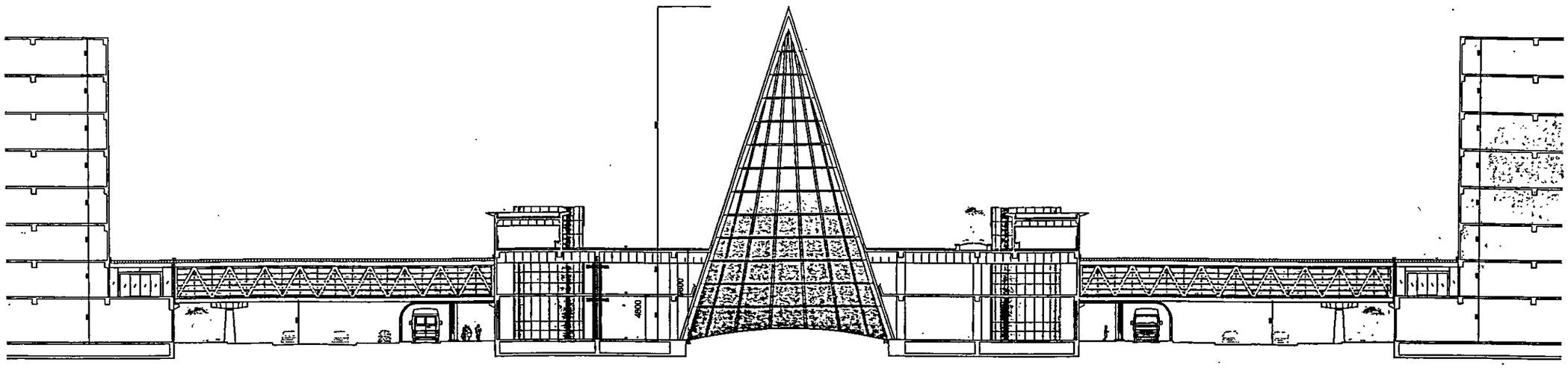
hall

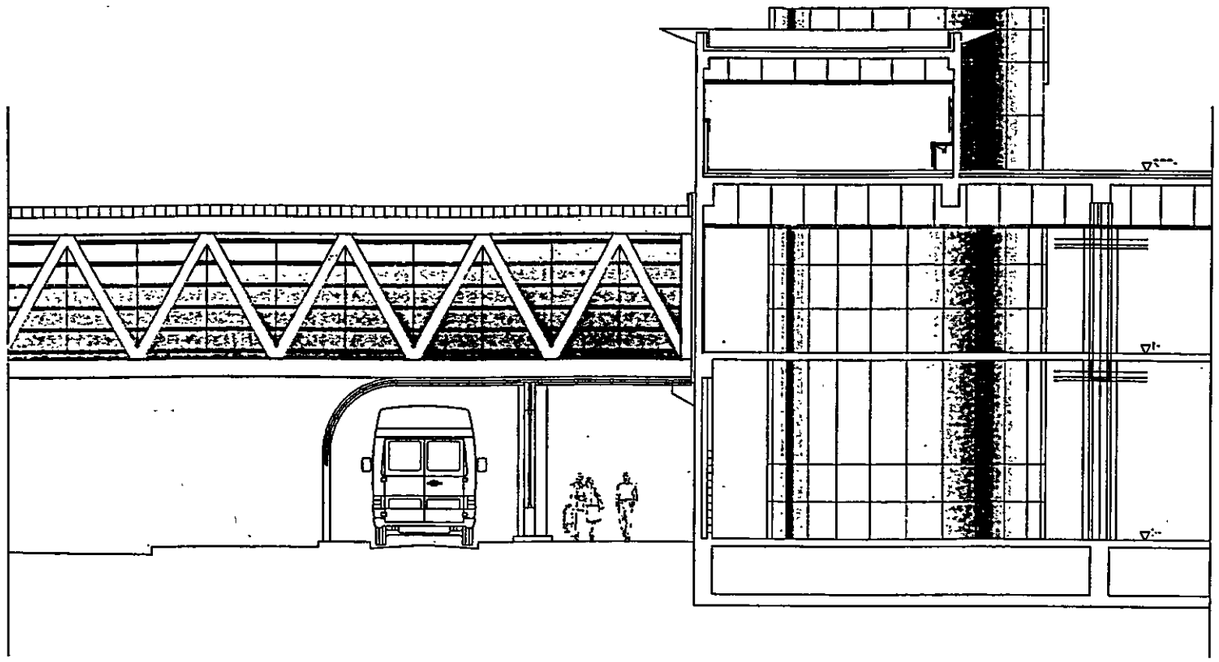
tambour

platform

traffic area


PAVILION type A
1
"GREEN HOUSE"
rest benches
book offices
cafe
kiosk
shuttle buses
shuttle bus
1
SCHEME OF BUS PAVILION type A
PAVILION SECTION 1-1
Выполнил:
проф. А.Чиканаев





2-3 MODEL DESIGN OF RESIDENTIAL COMPLEX

Outline of Residential Complex

Model design of the residential complex is worked out for the specific area along the left bank territory of the city. This territory is supposed to be built over with residential blocks, according to the approved Master Plan of Astana City.

The site area of residential complex is 76,200 m^2 (381x200m).

During the development of the design, solution of the following tasks was aimed at:

(1) design of the residential complex for the middle class people (The area of one unit is approximately 150 m^2)

(2) creation of comfortable environment in yard spaces, taking into consideration basic cold winds directions and snow drift conditions;

(3) creation of residential complex with developed blocks of cultural and consumer services;

(4) maximum provision of habitants with covered parking system;

(5) development of comfortable apartments, providing natural lighting and ventilation;

(6) provision of each apartment with small winter garden (approximately 25 m^2) and good view on the surrounding city landscape;

(6) creation of a new image of housing.

In the proposed model design, all these tasks are successfully accomplished.

Configuration of the residential complex, number of stories and its location on the site provide with accomplishment of the following tasks:

(1) protection from cold winter winds in winter period and from dust storms in summer time;

(2) sufficient insolation and good conditions for air circulation in each apartment;

(3) comfortable microclimate inside the closed spaces of housing yards.

In order to provide sufficient sunshine to each residence, the residential complex is developed in the form of blocks-sections of different height, 6, 8, 10, 12, 14, 16 stories. That produces good silhouette and makes the whole composition of the complex completed.

In the ground floor, there are parking and technical rooms, servicing two lower levels basically.

There is a public block in the first floor, where different service facilities take places (shops, community rooms etc.). Besides, habitants are able to reach their apartments from 1st floor (public floor) and ground floor (the parking level) using staircases and elevators.

Between public level and residential levels, it is proposed to make some technical floor for collection of all engineering services for upper housing floors. That solution provides autonomous functioning of public floor, leaving more space. The engineering services cost calculation also can be divided with private area and public area.

Layout of apartments has the following advantages:

(1) efficient zoning in apartments with separation of common rooms (sitting rooms and dining rooms) from bed rooms;

(2) arrangement of small winter garden, that allows to plant decorative trees and creates good view of the landscape;

(3) natural lighting and ventilation;

(4) provision of additional opportunities for future development of modern original interiors by means of transitory spaces of sitting rooms and winter garden.

The yard area consists of two interrelated parts, in which there are sports facilities, playgrounds, summerhouses etc. All the space, spare from above mentioned facilities is occupied by intensive greenery such as lawns, flowerbeds, trees and bushes. The close yard is duly protected from winds but at the same time has good sunshine.

The winter garden "Green house" is included in the yard composition and it is proposed to place small cafe and rest seats there, surrounded by exotic trees and flowers.

The proposed model design is an entire structure, provided with all necessary conditions for comfortable living and rest of the habitants. The modern residential complex can be built in the future, based on the proposed design.

While designing of residential house, much attention was paid to solving the following problems:

(1) ecological compatibility of materials and products;

(2) energy saving elements of windows and walls;

(3) anti-condensation methods;

(4) implementation of new technologies, connected with the use of solar energy for heating buildings and providing hot water.

For environmental safety, it is proposed to use natural materials such as stone and wood in reasonable combination with concrete and glassware.

It is widely known that 1 m^2 of efficient insulation material saves 1.45 tons of equivalent fuel per year. That's why the right choice of the most appropriate and rational material for wall construction is an important matter in the design. From many alternatives, Cellular concrete, produced under the technology "NEOPOR" (Germany) was chosen as the main material for walls, floors and ceilings.

The idea of the technology is production of light cellular concrete by means of adding of ultra-stable foam (based on protein components) to compo (cement-sand mixture).

In comparison with traditional materials, walls constructed according to "NEOPOR" technology have the following advantages:

(1) easy to produce and place;

(2) ecological compatibility and chemical neutrality; foam concrete ranks with wooden structures in economic sense;

(3) cost per unit for the material is less in 2 times than for structural clay tile, while power-consuming is less in 4 times;

(4) frost-resistance, incombustibility and good heat transfer resistance;

(5) lightness (weight – 470 kg/m^3); that reduces load on structures up to 30% and decreases steel consumption for reinforcement.

Along with walls, the size of windows, type of their glazing and type of frames have also great importance for energy saving. Reasonable glazing square ratio to facility square (1:6), providing necessary lighting and natural ventilation is proposed in the residential complex.

For glazing of windows, it is proposed to use double-chamber glass pack (PLANITERM-FUTURE system) with special low emissive glassware and there is inert gas inside the glass pack. The use of glassware (COOL-LITE system) provides with reasonable combination between light reflection (harmful spectrum) and energy saving. Inert gas inside the glass packet prevents condensation and window freezing. Casement is proposed to combine aluminum outside and wood inside, which provides durability and ecological compatibility of the structure.

Tambours, of which doors open and shut automatically and light is switched on and off due to photoelectric cell, are an important matter for energy saving.

The use of solar energy should be considered in the heating system. Nowadays, there are many various systems and methods how to use solar energy in order to provide electricity and heat.

Taking into consideration of climate of Astana City, reasonable combination between traditional methods for electricity and hot water provision and modern approaches of using solar energy is proposed in the design.

According to some preliminary calculations, in our case, solar power system can satisfy the demand of the residential complex for electricity and heat from 25% to 30%.

The following schemes can be used as photoelectric cells:

(1) equivalent circuit (reciprocal network);

(2) Schottky barrier junction scheme.

Solar batteries are located on sunny sides of roofs of the residential complex.

The main point of use of solar energy for passive heating is an accumulation of solar energy in special panels. Accumulated thermal energy is transferred to living quarters gradually so that it reduce electricity consumption for heating. Panels represent a compound combination of materials, capable to warm up by sunrays and preserve heat for a long time.

In the design, it is proposed to place panels along the whole surface of walls, exposed to sunrays. Panels can be arranged as walls themselves and have the same appearance as walls.

<Specification figures of the residential complex>

Site square in red lines – 7,6 hectares

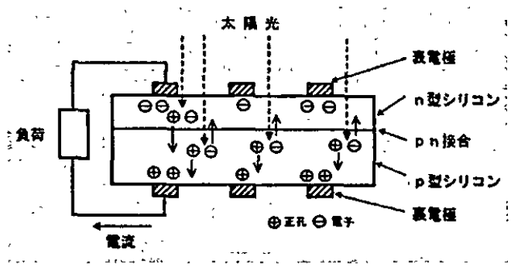
Number of flats – 1072

Number of habitants – 4288

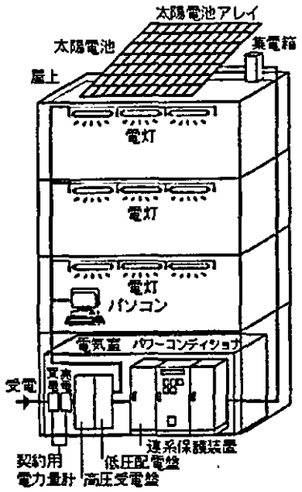
Housing density – 85%

Greenery percentage – 20%

Number of parking places - 600

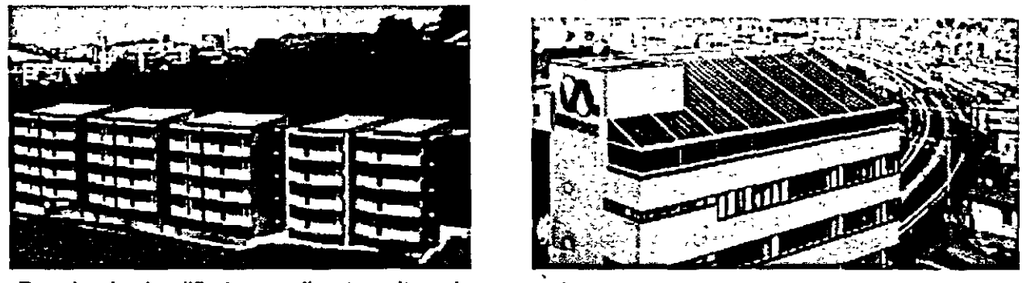


Principle of solar generator



Solar generating system

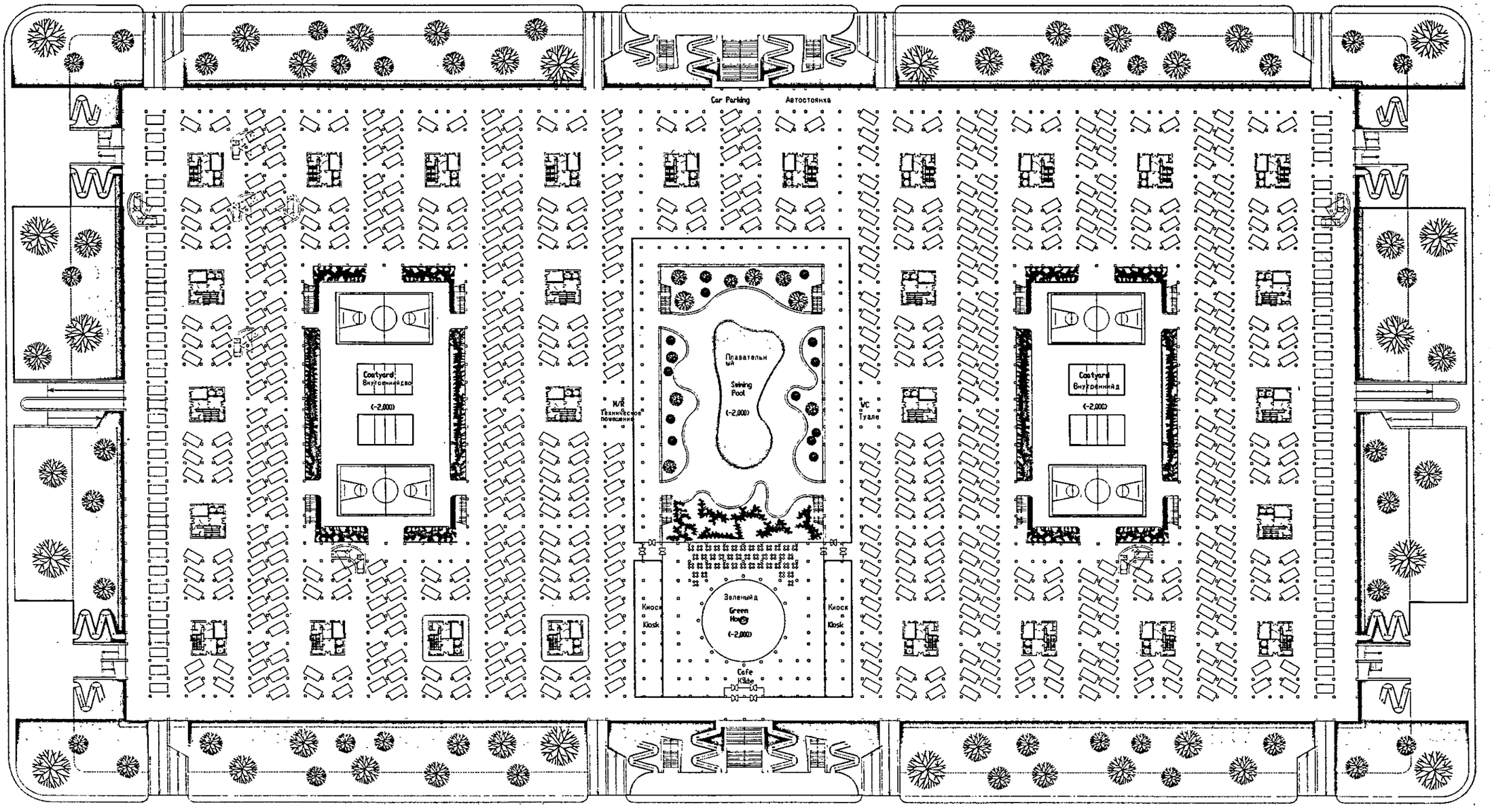
<The example of solar generating-1> Roof one body type

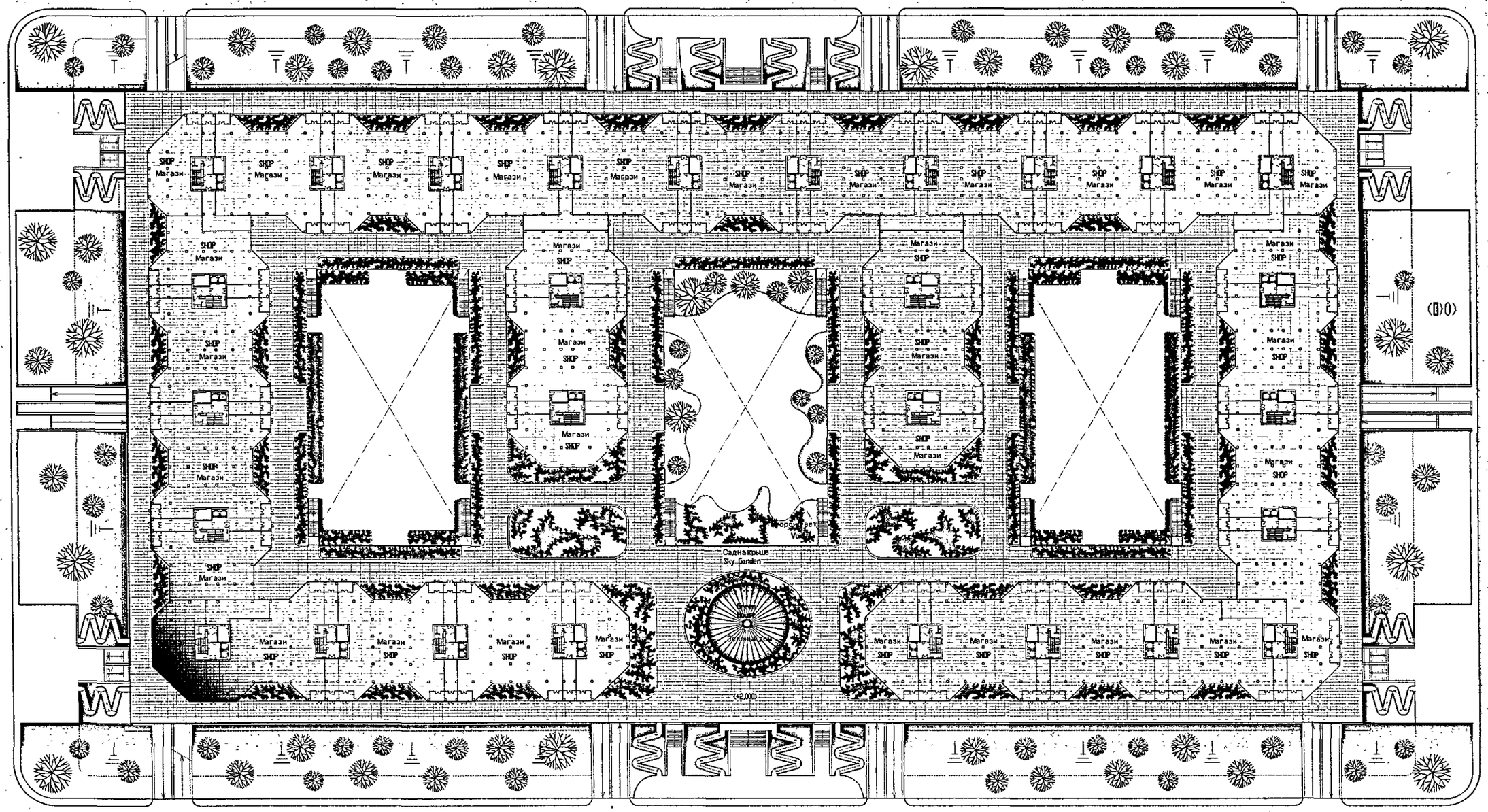


Deesign is simplified according to unite solar generator

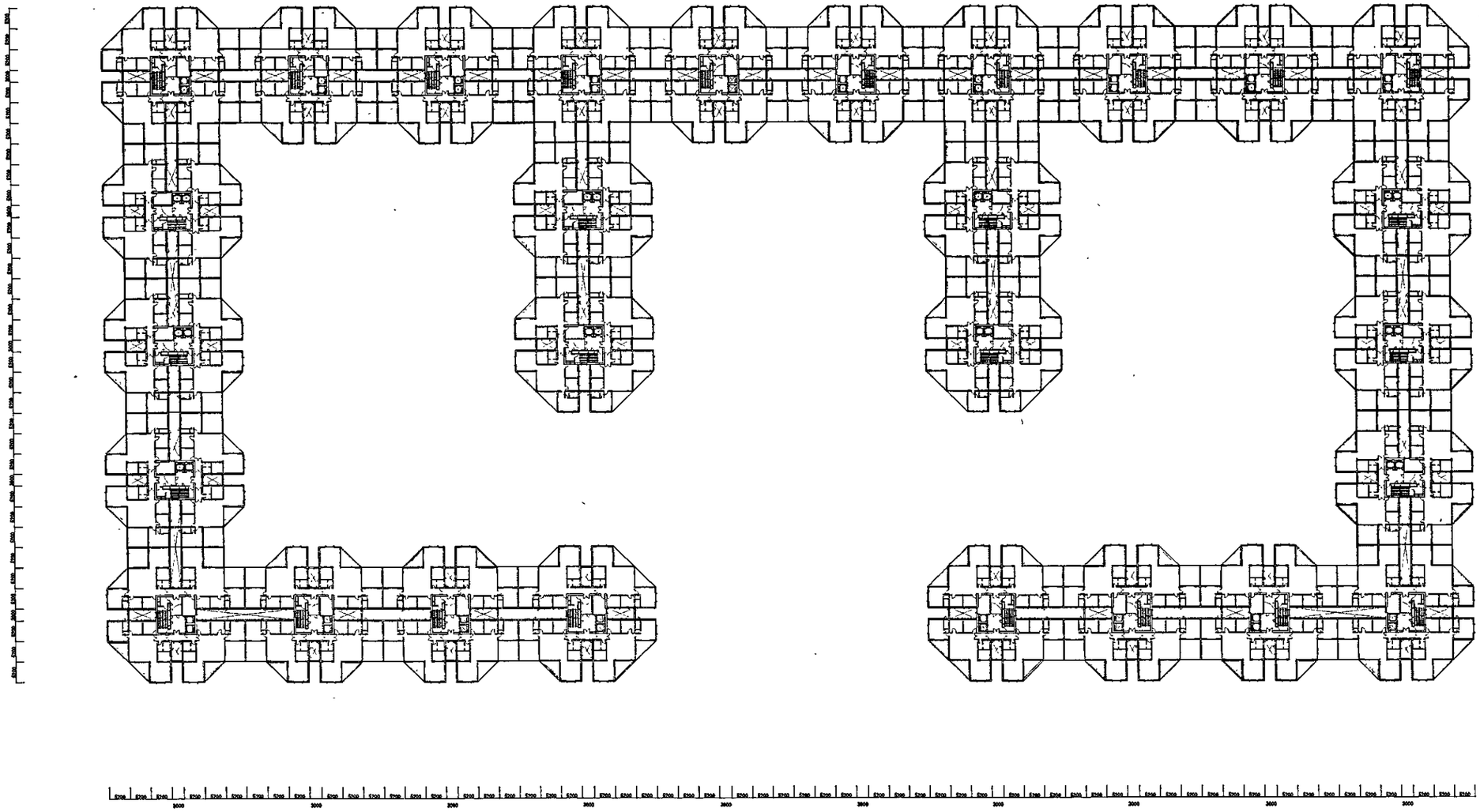
<The example of solar generating-1> See-through solar generator

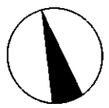
Using see-through solar generator, it is possible to gain both natural lighting and solar generating.

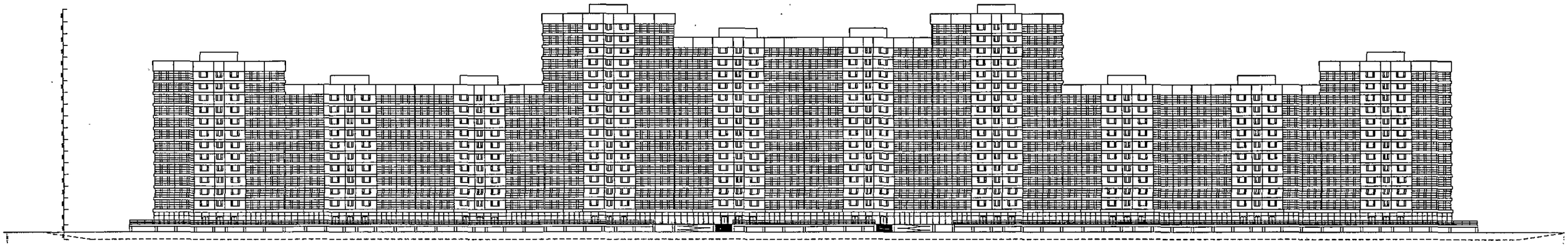

Car Parking
Автостоянка
Courtyard
Внутренний дво
(-2,000)
M/R
Техническое помещение
Плавательный
Swiming Pool
(-2,000)
WC
Туале
Киоск
Kiosk
Зеленый д
Green Ho
(-2,000)
Cafe
Кафе

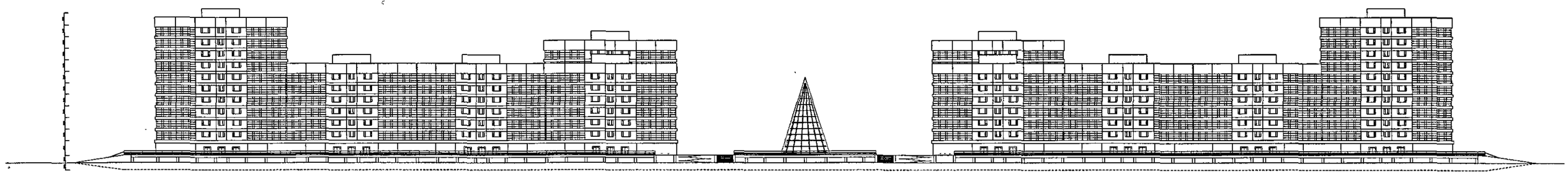

SHOP
Магази
Магази
SHOP
Садна крыше
Sky Garden
Зеленый зал
(+2,000)
(D)0)

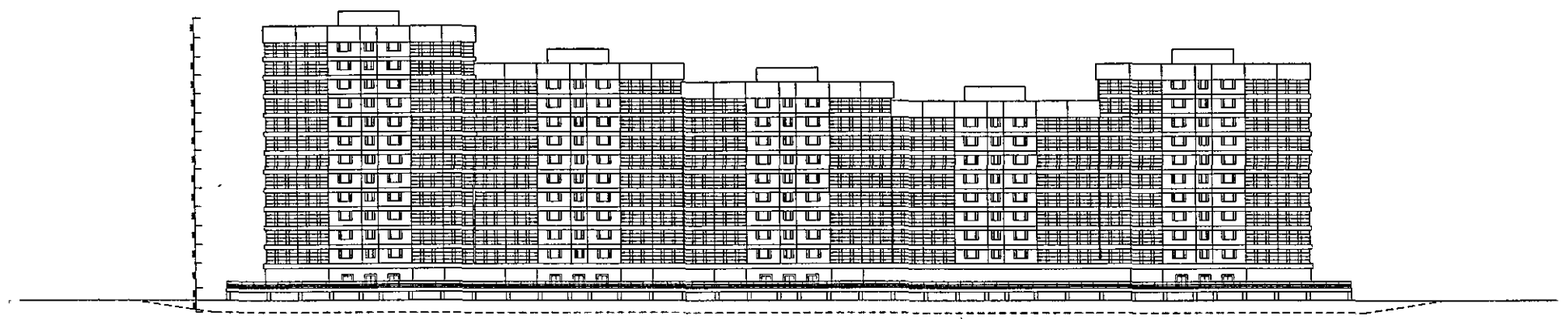
TEXT (E)



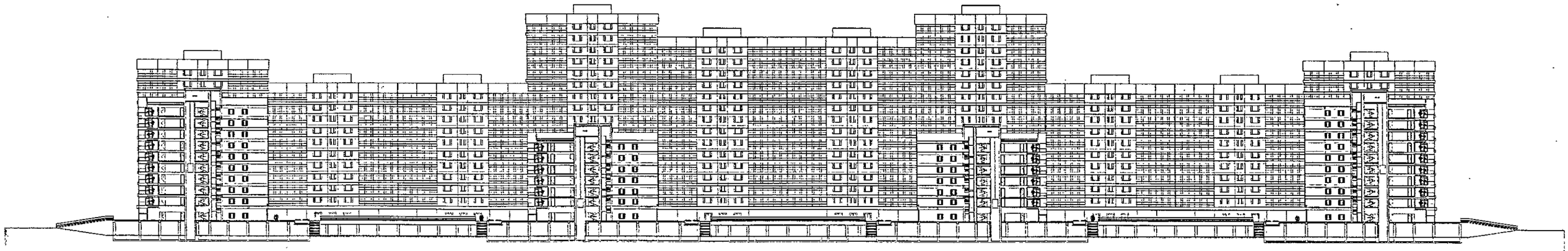


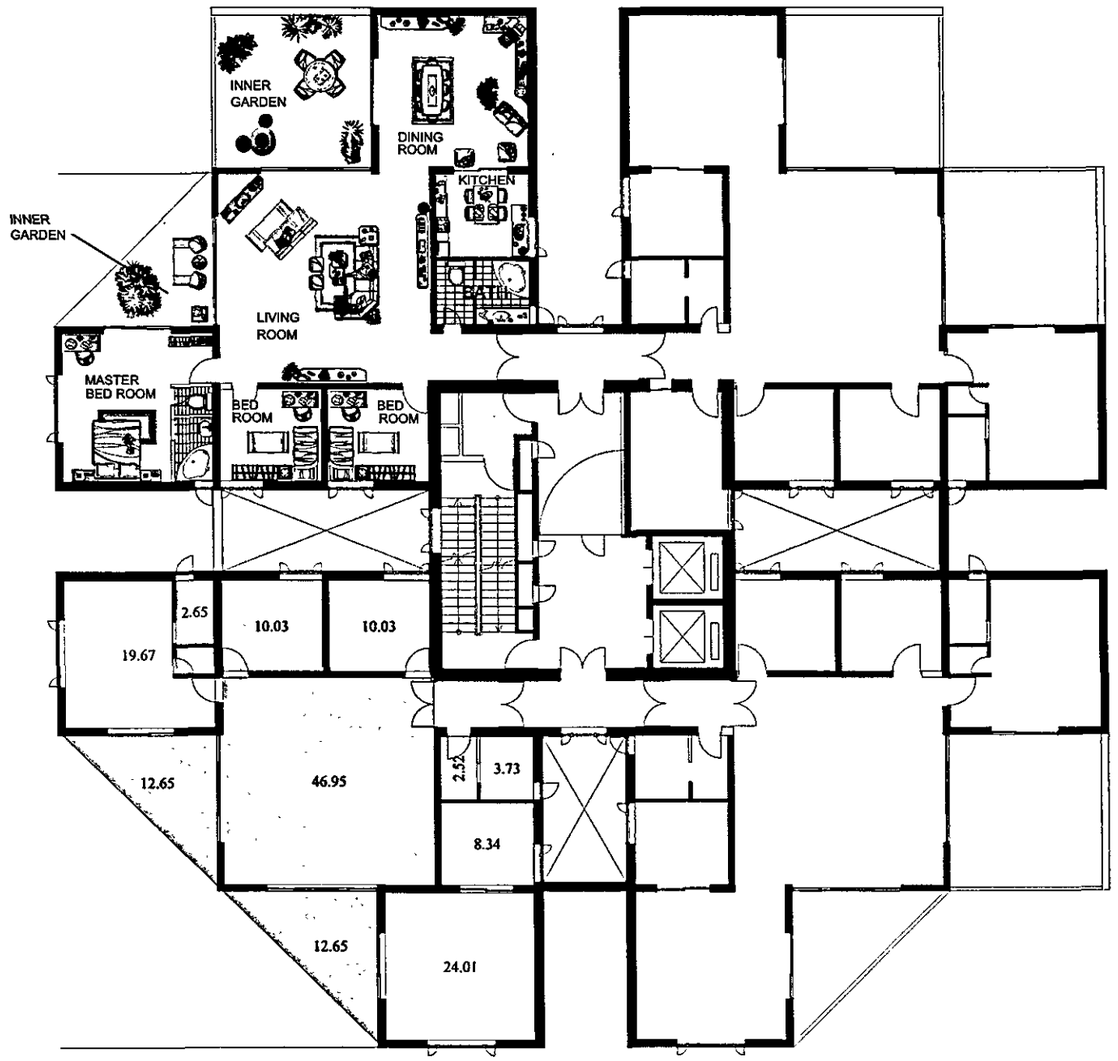






The Urban Design ModelDevelopment Study in Astana City in The Republic of Kazakhstan | ELEVATION | S=1/1,000 | Mar. . 2003 | KISHO KUROKAWA & ORTA LTD., DESIGN COMPANY | 40





ROOM NAME	AREA	
LIVING ROOM	50.41	m^2
DINNING ROOM	26.78	m^2
KITCHEN	9.52	m^2
BATH , WC	7.66	m^2
ENTRANCE	3.88	m^2
MASTER BED ROOM	26.78	m^2
BED ROOM(1)	11.55	m^2
BED ROOM(2)	11.55	m^2
SUB TOTAL	148.13	m^2
INNER GARDEN	27.04	m^2
TOTAL	175.17	m^2

The basic element of residence is shown above. Living room is located on the center of each residence, and dining room, bed room, bath etc. are placed around it. Inner garden is located in front of the living room and used as private garden.

2-4 MODEL DESIGN OF PARK

Outline of Park

According to the investigation to the local consultant, landscaping along the Ishim river became clear to have been finished already by ORTA. At the first trip to Astana (12/11～12/25), JICA study team and DOA agreed to design presidential park at the opposite site of presidential palace across the Ishim river. But at the 2nd trip to Astana (1/17～1/26), it became clear that some public buildings would be made in this site. According to the discussion , DOA and JICA study team agreed to design island park on the artificial island in the Ishim river in the southern part of the presidential palace.

Basic idea of the design is to create in miniature the most typical natural landscapes of different regions of Kazakhstan (mountains, lakes, forests, steppes, deserts etc.).

The ethnic dendro-park basically intended for quiet, secluded rest amidst gorgeous scenery of Kazakhstan.

In the design it is proposed to create the following natural sights of the Republic:

(1) Alatau and Kokshetau mountains;

(2) Usturt tableland and Charyn canyon;

(3) feather grass steppes of Sary-Arca and forests of the Eastern Kazakhstan;

(4) Kokshetau and Kulsary lakes;

(5) deserts and takyrs.

Places of animate nature should be created by means of natural materials, identical to originals. Greenery types (trees, bushes, grass etc.) should also correspond to each represented region.

In order to protect the island from flooding, it is proposed to construct an embankment along Ishim riverside.

It is proposed to construct an embankment in the form of Usturt tableland. Between an embankment and riverside, spacious and comfortable beach can be placed.

The artificial channel, symbolizing rivers of Kazakhstan, can be used for water rest.

In the middle of the island, it is proposed to create a pond, which represents lakes of Kazakhstan.

In the middle of the pond, it is proposed to recreate a natural island "Zhumbaktas" and Alatau and Kokshetau mountains will surround the pond.

All the rest of the territory should also reflect the unique places of the Republic. Picturesque paths for walk and all citizens can enjoy walking and rest.

Public lavatories as well as kiosks, selling souvenirs and refreshments are supposed to be placeed along the whole island territory. The appearance and form of the facilities should also reflect the architectural stylistics of the regions and be in harmony with environment.

In order to cover maintenance costs, complex of entertainment facilities can be located in some determined places without violation of the natural harmony. One of the proposed variants of the complex is the system of halls for attractions, which can be placed inside mountains. For excursions, chargeable traveling routes can be placed on the island territory, while boat stations can be placed along the channel area.

<Specification figures of the ethnic dendropark "Atameken-Motherland">

General square – 8 hectares

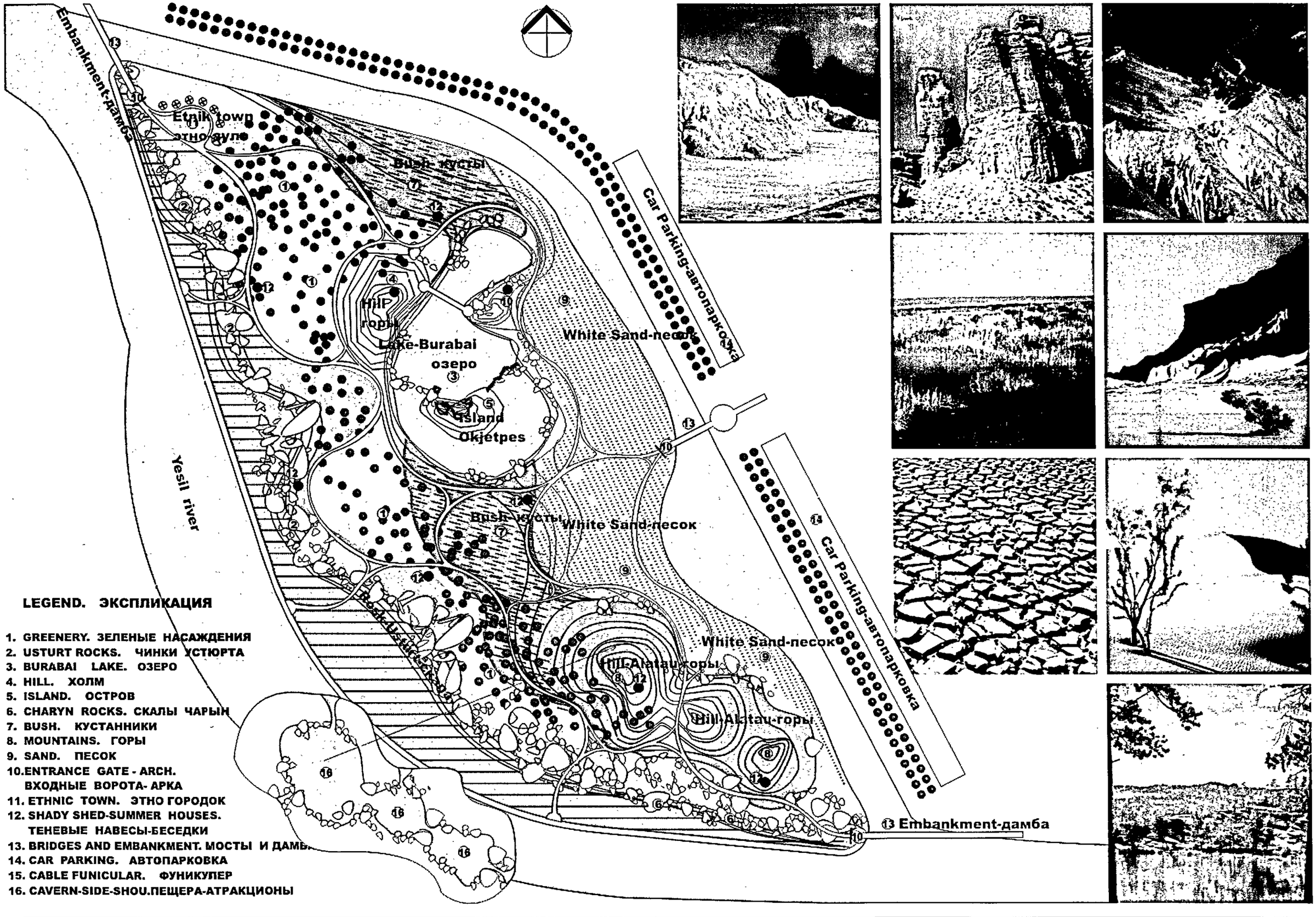
General dimension – 1500x600m.

The highest point – 30 m.

Greenery square – 5,5 hectares

Beach square – 1,8 hectares

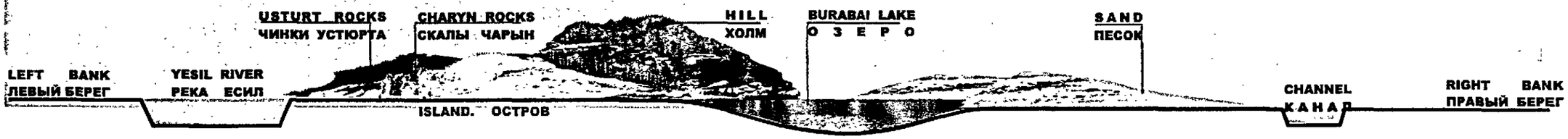
Lake square – 0,8 hectares



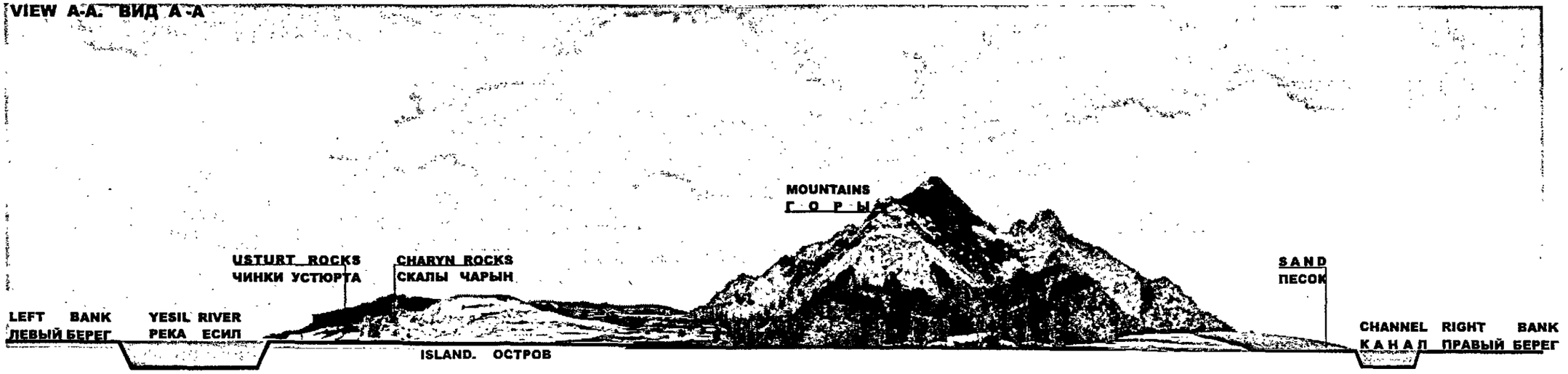
LEGEND. ЭКСПЛИКАЦИЯ

1. GREENERY. ЗЕЛЕНЫЕ НАСАЖДЕНИЯ
2. USTURT ROCKS. ЧИНКИ УСТЮРТА
3. BURABAI LAKE. ОЗЕРО
4. HILL. ХОЛМ
5. ISLAND. ОСТРОВ
6. CHARYN ROCKS. СКАЛЫ ЧАРЫН
7. BUSH. КУСТАННИКИ
8. MOUNTAINS. ГОРЫ
9. SAND. ПЕСОК
10. ENTRANCE GATE - ARCH. ВХОДНЫЕ ВОРОТА- АРКА
11. ETHNIC TOWN. ЭТНО ГОРОДОК
12. SHADY SHED-SUMMER HOUSES. ТЕНЕВЫЕ НАВЕСЫ-БЕСЕДКИ
13. BRIDGES AND EMBANKMENT. МОСТЫ И ДАМБ
14. CAR PARKING. АВТОПАРКОВКА
15. CABLE FUNICULAR. ФУНИКУЛЕР
16. CAVERN-SIDE-SHOU.ПЕЩЕРА-АТРАКЦИОНЫ

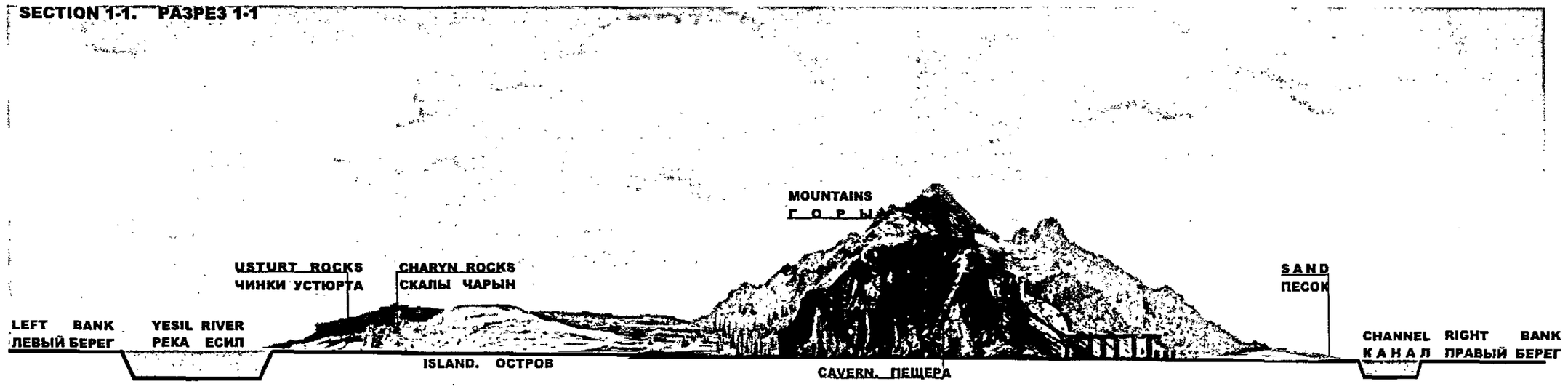
VIEW B-B. ВИД В-В



VIEW A-A. ВИД А-А



SECTION 1-1. РАЗРЕЗ 1-1



ДЕРЕВЬЯ ЛИСТВЕННЫЕ
BROAD - LEAVED TREES

ТОПОЛЬ ЧЕРНЫЙ
BLACK POPLAR

15-20м

ДЕРЕВЬЯ ХВОЙНЫЕ
C O N I F E R

С О С Н А
ОБЫКНОВЕННАЯ
SCOTCH PINE

25-30м

5м

СОСНА ВЗРОСЛАЯ
GROWN-UP PINE

СОСНА ДО 10 ЛЕТ
PINE UP TO 10 YEARS

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

ДУБ ЛЕТНИЙ
O A K

30м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

Б Е Р Е З А
БОРОДАВЧАТАЯ
B I R C H

15-20м

КУСТАРНИКИ ЛИСТВЕННЫЕ ДЛЯ ПОПИСАДНИКОВ
BROAD - LEAVED BUSHES FOR GARDENS

СИРЕНЬ
LILAC

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
BROAD - LEAVED TREES

ТОПОЛЬ БЕЛЫЙ
A B E L E

15-20м

ДЕРЕВЬЯ ХВОЙНЫЕ
C O N I F E R

ЕЛЬ ОБЫКНОВЕННАЯ
F I R T R E E

25 м

ЕЛЬ ОБЫКНОВЕННАЯ
F I R T R E E

ЛИСТВЕННИЦА
СИБИРСКАЯ
SIBERIAN LARCH

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

ВЯЗ
ELM

30м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

ИВА ВЕТЛА
WILLOW

15-20м

КУСТАРНИКИ ЛИСТВЕННЫЕ ДЛЯ ПОПИСАДНИКОВ
BROAD - LEAVED BUSHES FOR GARDENS

ШИПОВНИК
DOG-ROSE

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
BROAD - LEAVED TREES

Я С Е Н Ь
ОБЫКНОВЕННЫЙ
ASH-TREE

15м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

Р Я Б И Н А
ОБЫКНОВЕННАЯ
WIGGEN

10м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

АКАЦИЯ БЕЛАЯ
L O C U S T

15м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ С ПИРАМИДАЛЬНОЙ КРОНОЙ
DECIDUOUS TREES WITH PYRAMIDAL CROWN

ТОПОЛЬ ЧЕРНЫЙ ПИРАМИДАЛЬНЫЙ
LOMBARDY POPLAR

25-30м

КУСТАРНИКИ ЛИСТВЕННЫЕ ДЛЯ ПОПИСАДНИКОВ
BROAD - LEAVED BUSHES FOR HEDGES

БОЯРЫШНИК
HAWTHORN

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
BROAD LEAVED TREES

К Л Е Н
ОСТРОЛИСТНЫЙ
M A P L E

15-20м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ
DECIDUOUS TREES

К Л Е Н
ЯСЕНЕЛИСТНЫЙ
M A P L E
S Y C A M O R E

10м

ДЕРЕВЬЯ ЛИСТВЕННЫЕ С ПИРАМИДАЛЬНОЙ КРОНОЙ
DECIDUOUS TREES WITH PYRAMIDAL CROWN

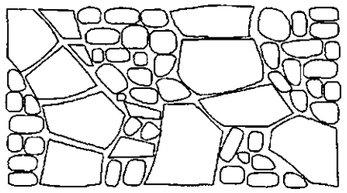
ТОПОЛЬ БОЛЛЕ
P O P L A R

20-30м

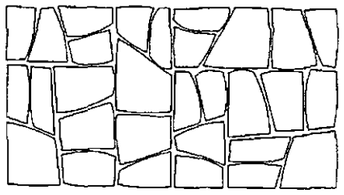
ДЕРЕВЬЯ ЛИСТВЕННЫЕ С ПИРАМИДАЛЬНОЙ КРОНОЙ
DECIDUOUS TREES WITH PYRAMIDAL CROWN

ДУБ ЛЕТНИЙ
ПИРАМИДАЛЬНЫЙ
OAK

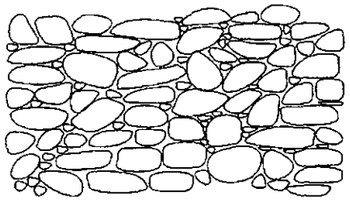
20-30м



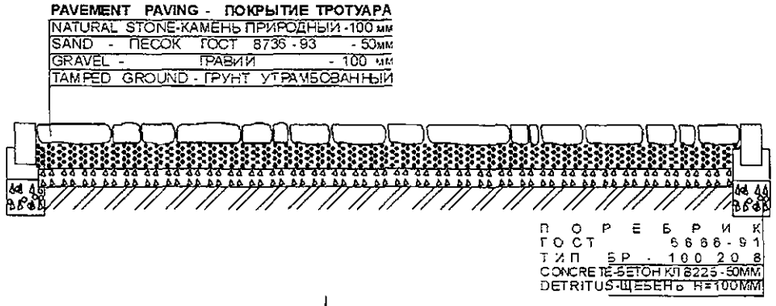
BRECCIA
TYPE-1
БРЕКЧА
ТИП - 1

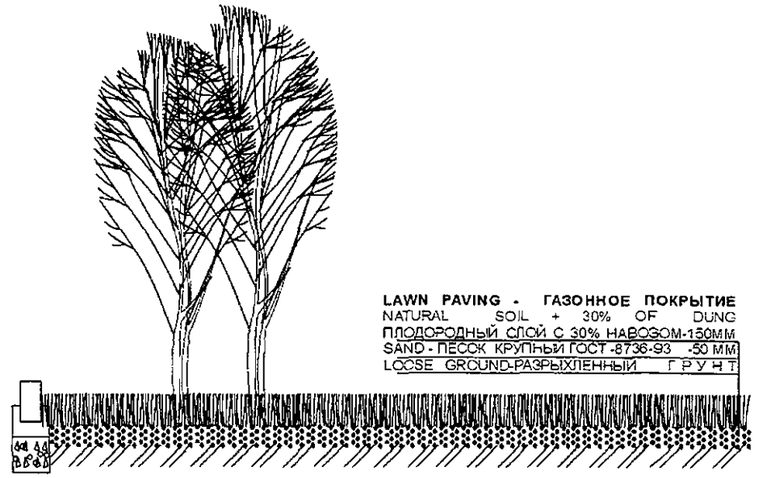


MOSAIC
TYPE-2
МОЗАИКА
ТИП - 2

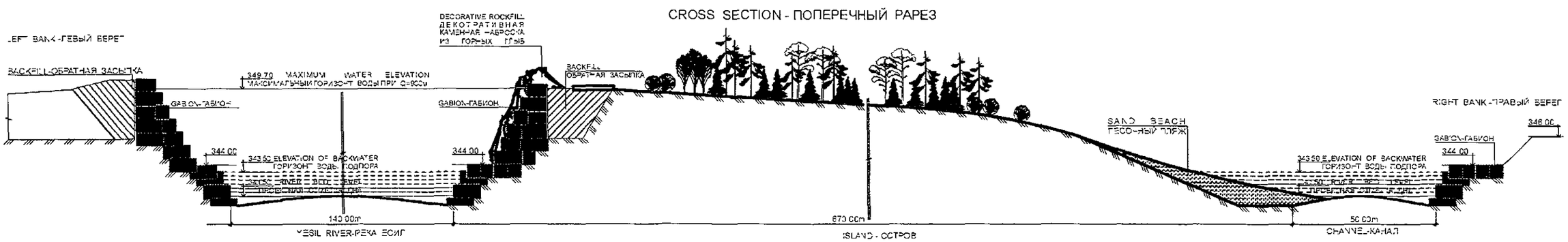


PEBBLE
TYPE-3
ГАЛЬКА
ТИП - 3

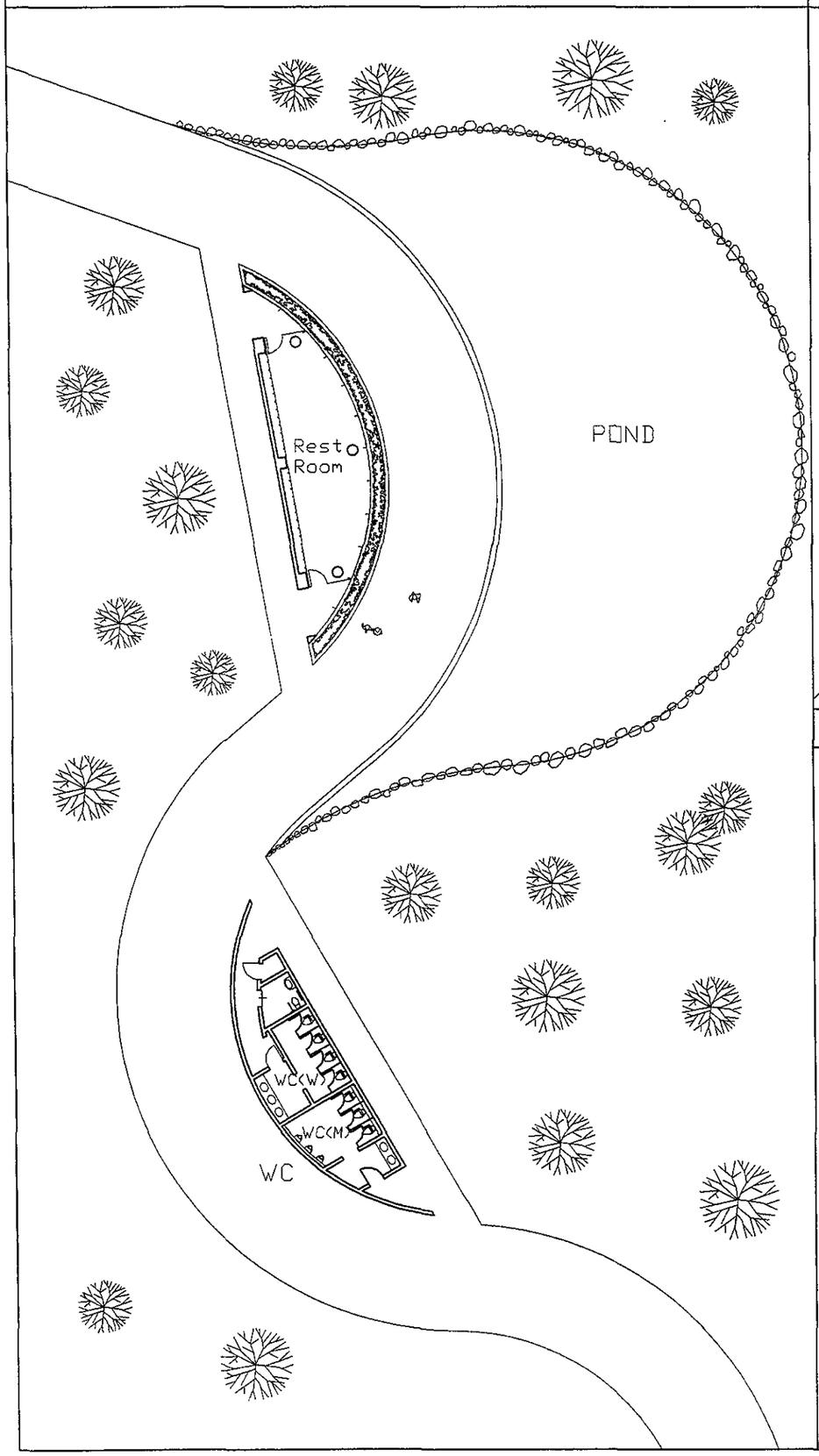




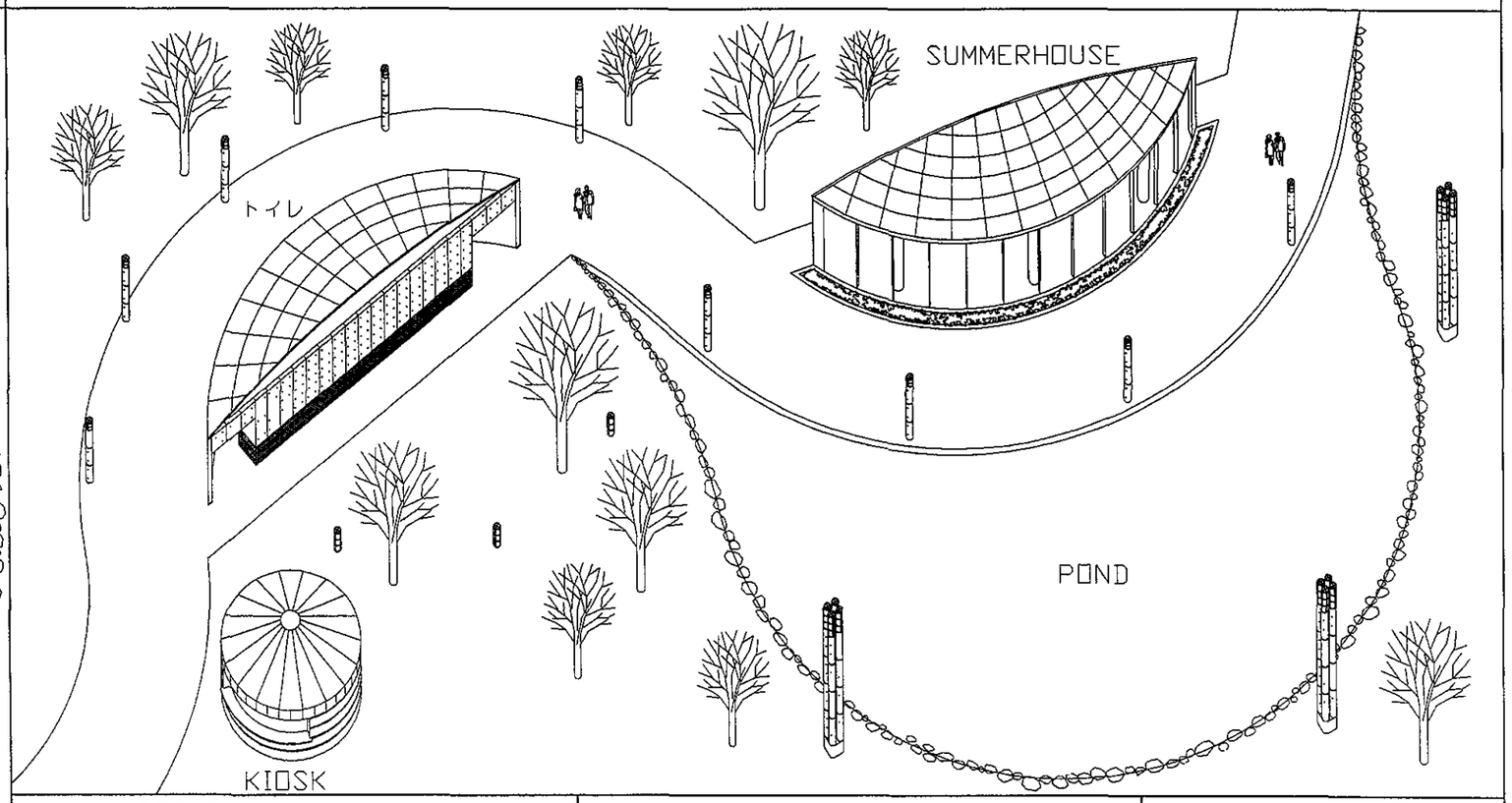
CROSS SECTION - ПОПЕРЕЧНЫЙ РАРЕЗ



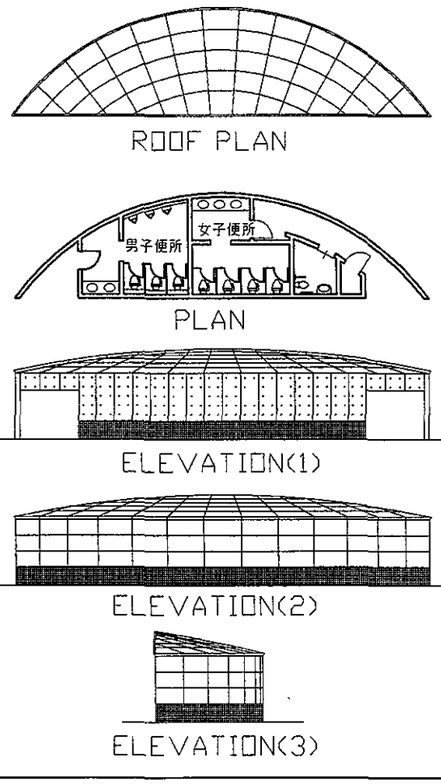
SITE PLAN



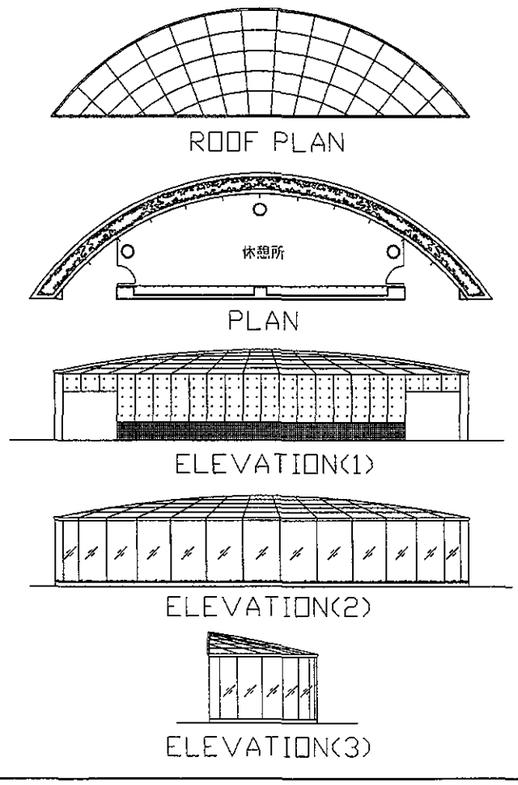
IMAGE



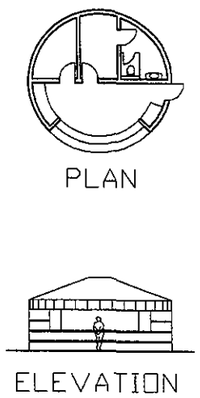
DETAIL OF TOILET



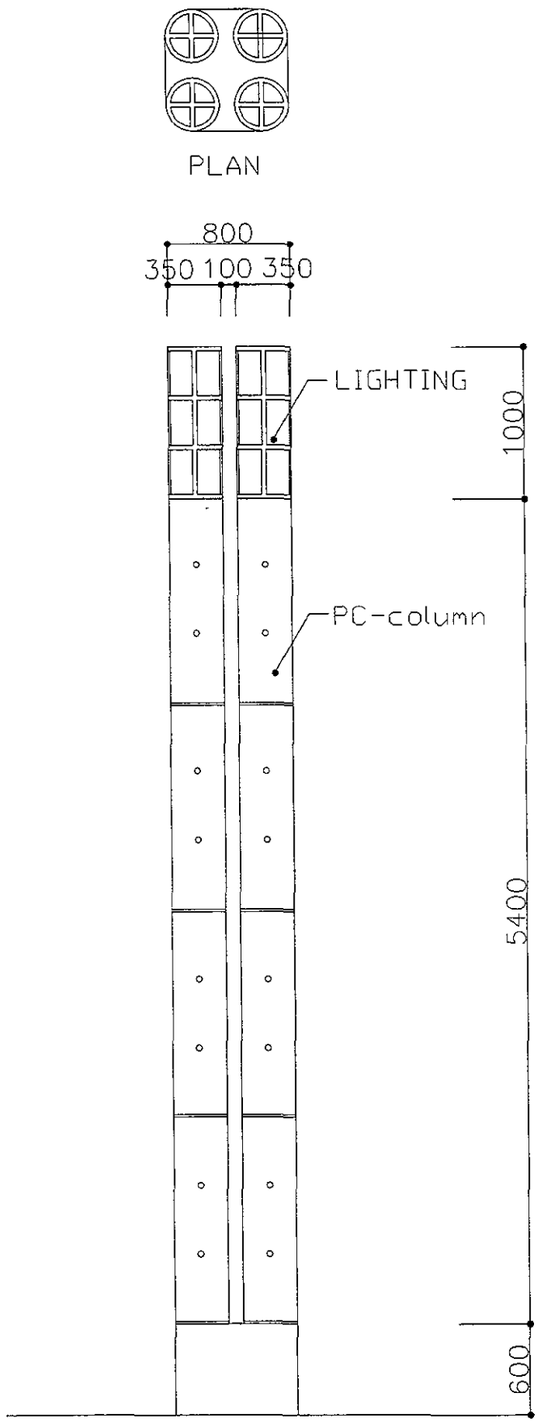
DETAIL OF SUMMERHOUSE

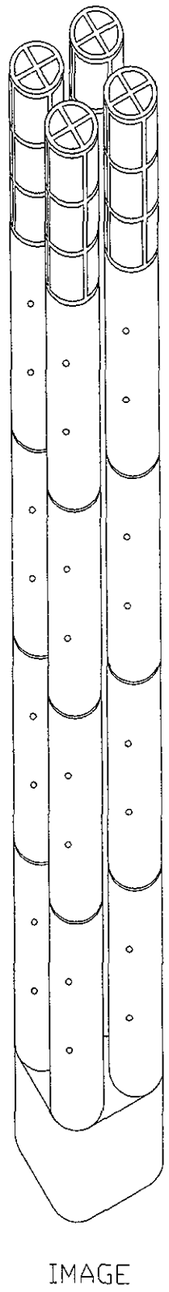


KIOSK

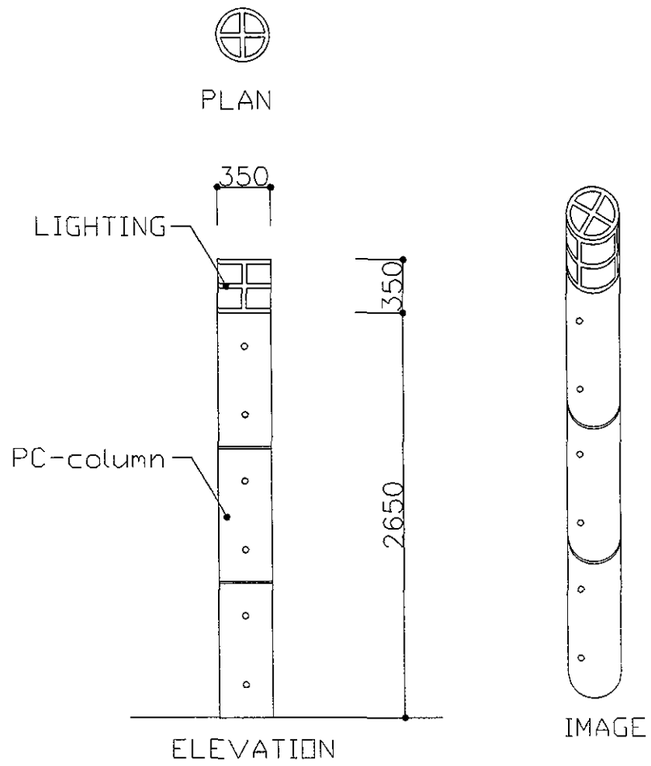


POLE LIGHTING-1 S=1/40

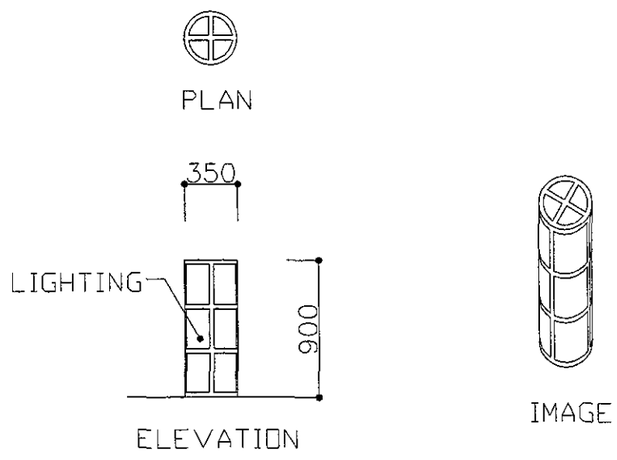


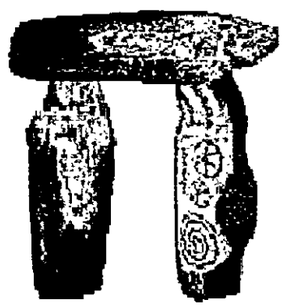


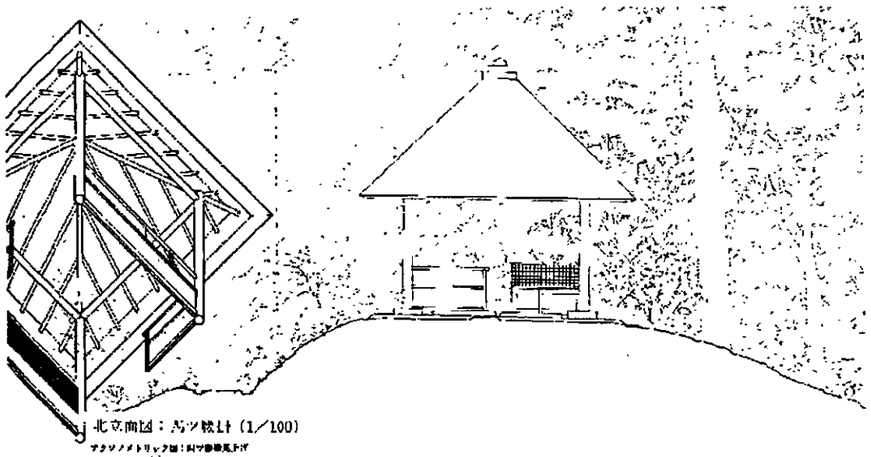
POLE LIGHTING-2 S=1/40

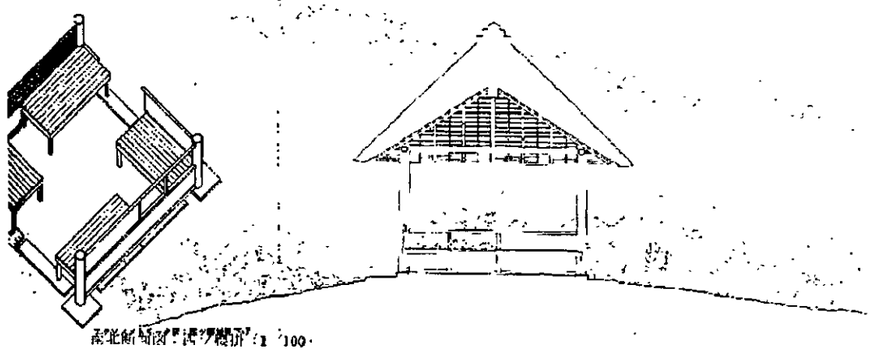


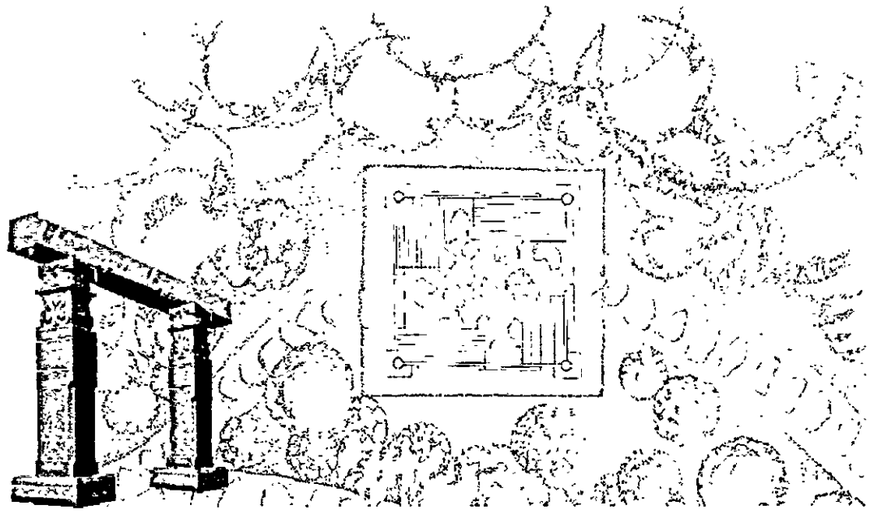
GARDEN LIGHT S=1/40

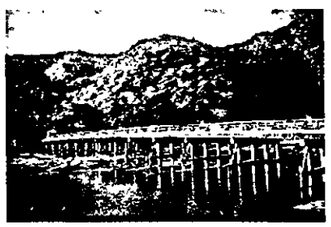


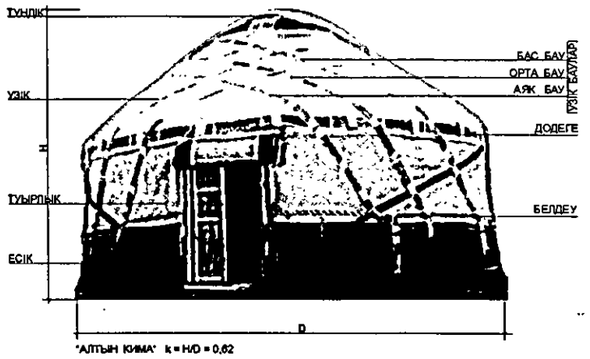












КИГІЗ ҮЙДІҢ КАНКА СҮЙЕГІ