



Activities of the Design Academy «KAZGOR» Closed Joint-Stock Company

Design Academy «KAZGOR» founded in 1930 is a company with private form of property since 1993, the oldest design organization, the author of unique buildings and structures, construction works for numerous cities and residential areas of Kazakhstan, Russia and other CIS countries, and also a participant of a number of international competitions in design of large-size buildings and facilities (France, Japan, South Korea etc.). The Academy maintains constant state of renewal and development due to the work of experts, architects, designers and engineers of high qualification, capable of implementing modern-level projects.

Kazgor activity is licensed by Kazakhstan Construction Committee's State Construction Licensing Dept., state license No. GSL 000004 of 24/11/1994.

Re registration – the confirmation of the status of license owner covering the List of works in the sphere of architectural and urban planning activity which is accomplished by JSC «KAZGOR» according to the conducted technical revision and appraisal given upon the order of KazstroyCommittee on November, 21 in 2001 №241 (also designing of structures and buildings for oil and gas industry). In addition, in conformity with the protocol from 15.01.02 of Committee of Department dealing with the inspection of emergency, technical and mining at Agency of RK the Academy was given the permission on designing of projects connected with oil – gas industry, geology and oil-gas mains, underground structures and objects causing explosion and fire.

During its creative and activity Design Academy «KAZGOR» has been dealing with designing of residential and civil buildings and industrial complexes, including high and secondary school buildings, also development of cities and territories.

DA «KAZGOR» has wide experience of Projects design in the Western region of Kazakhstan, in Atyrau and Atyrau oblast, particularly, the most significant can be considered the projects designed at the technical and economic calculation stages, projects and detail designs, on which the buildings and complexes were constructed:

1) «TCO Headquarters»: Residential Complex in Atyrau, Kazakhstan

Design of DA «KAZGOR» together with USA companies: YGH Architecture, KPFF, Interface Eng.

Contractor: «ZAFER», Turkey

Status: completed construction, commissioning.

The construction development of the residential complex in mainly formed from 44 duplex houses (2-story, 2-apartments) with garages, houses of managers with garages, also two-storied building of school, including the kindergarten, elementary and secondary school forms with musical class, technical and computer labs, library and closed internal yard for the holding meetings, concerts and performances at any season of the year; facility of sports and cultural center, club building. In the engineering block the diesel generators, transformer and distribution devices, water treatment unit, boiler-house and other engineering equipment.

2) «TCO Headquarters»: The project of the office building in Atyrau, Kazakhstan.

DA «KAZGOR» - designing company and supervision during construction.

Contractor: «FINTRACO», Turkey

Building of office is 8-storeyed with the deckhouse above the part of covering, the skeleton

from cast-in-place reinforced concrete.

Office for 400 employees, with total area of premises - 28 000 sq.m., includes also conference halls, business centers, training center, etc.

In the engineering block the water treatment units, boiler on gas fired, diesel generator, accumulation battery on full load of computer network.

3) **External pipelines mains and other networks of the TCO office and residential complex in Atyrau:** power supply (10 km), gas supply (4 km), water supply (5 km) and sewage system (2,4 km), and also heat supply utilities and engineering facilities, development of structure solutions of facility of sewage pump station.

4) **Tengiz Oil Field Development** (Test-production operation 1st stage). Master plan and detailed planning development of Kulsary village, construction area development of the microdistricts №1, 2, 3, 4, 5, 5A, 6, utility mains of microdistricts of the town-settlement Kulsary, Atyrau region, 1986-1994.

5) **Designing of residential and civil purpose buildings and engineering facilities of the Rotation Village, Tengiz, (1986-1992)**

6) **School for 624 pupils, in the village Ganyushkino, Atyrau region, 2001.**

7) **Barrack on 64 men and six-apartment accommodation building of boundary station at the Kazakh-Turkmen boundary.**

8) **Republican competition on construction area development of the new center of Atyrau - «Draft-idea of the Atyrau Center Master Plan» (the first premium-prize), (2001)**

9) **On contract with PFD - TCO companies on TCO ASSET DEVELOPMENT PROJECTS - Second Generation Project and Sour Gas Injection, DA «KAZGOR» has implemented study of TCO village for the purpose of its extension and study of «Balkan» warehouses for their further reconstruction, with developing the scope of work and determination of estimate cost, and also with making Master plan and detailed drawings.**

10) **Polyfunctional Center “NURLY TAU” on the central esplanada of Almaty city, 2002**

11) **Sports and Health care Complex near Almaty, 2002.**

STRUCTURE

“KAZGOR” Design Academy includes Centers:

- design,
- information-technical,
- pricing and cost estimation norms,
- publishing,
- operation and
- refurbishment services.

The Center for design consists of several groups: architects, structure engineers, electrical systems engineers, mechanic engineers for water supply and sewage systems, heating and ventilation, gas supply. The staff is now 150 people, which, if necessary, can increase to 250.

COOPERATION

"KAZGOR" collaborates with foreign companies: "AYSEL" (Turkey), "RANK XEROX" (UK), "CHEVRON" (USA), "DELOITTE & TOUCHE" (Cyprus); S.C.I.S. spl (Italy), "PLUSSIS" (Austria), etc. Since 1997 "KAZGOR" holds joint design activities with USA companies: YGH (architecture), KPFF (structures), Interface Engineering (engineering networks) for a large project of TengizChevrOil: TCO Headquarters, office and residential complex in Atyrau. Actually DA "KAZGOR" closely collaborates with the PFD Company (UK, Camberley) which manages the engineering, construction works and procurements on TCO ASSETS Development Projects in sphere of project evaluation and control of the observance of Codes and Standards of RK in construction by constructors.

ADDITIONAL SERVICES

"KAZGOR" provides its own engineering services for project customers, including initial data collection (technical conditions), issuing and obtaining study tasks for specialized institutions (such as Geotechnical Center of KazGIIZ in Atyrau), technical project support during construction, combining the functions of both customer and contractor.

"KAZGOR" has participated in the international competition for the draft idea of Astana city Center Master Plan, the development of which should consider drainage, water supply and sewage issues.

The experts of academy will carry out inspection of buildings, structures, facilities with an estimation of their reliability and stability, including with construction in seismic areas, implement the expertise.

Design Academy "KAZGOR" with partners: LLC "Information Center of STROYCONSULTANT" (Russia, Moscow) and corporation "SNIP Register Inc" (USE, Chicago) offer assistance services – provide the information and technical electronic database of Standards and Codes valid at the territory of the Republic of Kazakhstan on the compact-discs (CD).

EQUIPMENT

The computer base and software is completely updated which correspond to all modern requirements. Projects executed by successfully licensed program "AUTOCAD (versions 14 and 2000-graphic package). DA "KAZGOR" is the leader and unique firm in Kazakhstan on use of calculate and projecting complexes "LIRA-Windows-8a and 9" and "MONOMAKH-2". Of more one hundred twenty graphic workstations (" Pentium MMX ", " PentiumIII, 333 ", Pentium IV-Flatron) are incorporated in high-speed (100 Mbit/s) LAN with allocated server. Laser printers A3-A4 format (HP, Apple Macs), large format HP DesignJet-2500CP plotter allow full-color project documentation of high quality. Information exchange technology includes Internet, E-mail and Fax capabilities.

OTHER CENTERS ACTIVITIES

"KAZGOR" Design Academy is the one and only leading organization in Kazakhstan, dealing with pricing for state and private construction orders, including the determination of current and monthly forecasted prices within construction complex of Kazakhstan.

The Academy has the Publishing Center, equipped with modern copying equipment: Rank Xerox 3050, 2520, 5100, brochure machine Xerox ASF 100, duplicator RISO 3770 and

other. The Operation Center produces design and makes renovations to buildings with their structure reinforcement, custom interior and facade refurbishment using modern materials according to customers requirement.

ADDITIONAL INFORMATION

“KAZGOR” Design Academy has expert engineers capable of doing technical translation of documentation and correspondence into English.

“KAZGOR” Design has an affiliation in Astana and a representative office in Taldykorgan.

The wide experience of work of academy guarantees definition of cost of building objects within the limits of the selected sum.

A. Sh. Tatygulov,

*President of Design Academy “KAZGOR”,
Professor*



A handwritten signature in black ink, appearing to read "A. Sh. Tatygulov", is written over a horizontal line that extends from the seal.



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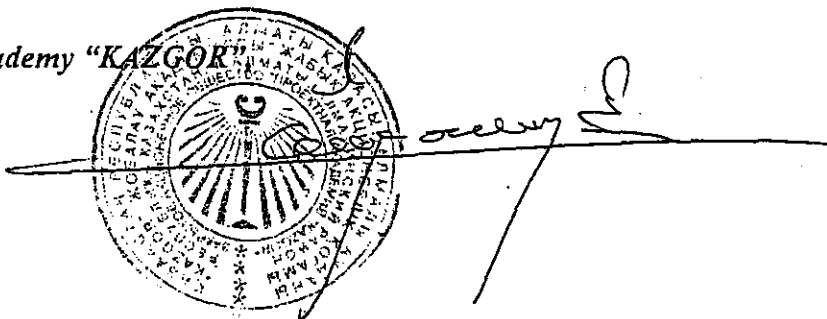
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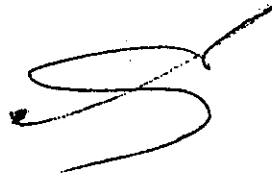
President of Design Academy “KAZGOR”
Professor



List and Scope of Design Works

N	Types of Works	Number of ManMonths	Amount per a Unit Tenghe/Month	Amount (Tenghe)
<i>1. Total amount of design services including</i>				
1.1	Salary			
	Architects (3 employees)	6	450 000	2 430 000
	City Planning Specialists (2 em-s)	4	405 000	1 620 000
	Landscape Architect (1 em-e)	2	405 000	810 000
	Transport Engineer (1)	2	405 000	810 000
	Hydrologist - Engineer (1)	2	405 000	810 000
	Total - item 1.1			6 480 000
1.2	Auxiliary Staff			
	AutoCAD operator (3 employees)	6	200 000	1 200 000
	Secretary (1 employee)	2	120 000	240 000
	Total - item 1.2			1 440 000
1.3	Direct Expenses			
	PC (7 pieces)	14	110 000	1 540 000
	AutoCAD Equipment			2 500 000
	Transport shipment (1 vehicle)	2	250 000	500 000
	Paper			471 035
	Total - item 1.3			5 011 035
	Total - item 1.1. - 1.3.			12 931 035
	Including 16 % VAT			2 068 965
	TOTAL:			15 000 000

First Vice-President
Design Academy "KAZGOR"



Eraliev T.

Schedule of work in Astana

	December			January			February			March		
	10	20		10	20		10	20		10	20	
Design Development												
Specification												
Calculation Sheet												

Design company ORTA LTD.

DOCUMENTS
for participation in tender
«Development of model projects for town
planning development of Astana City
in the Republic of Kazakhstan»

Client: Research Group JICA

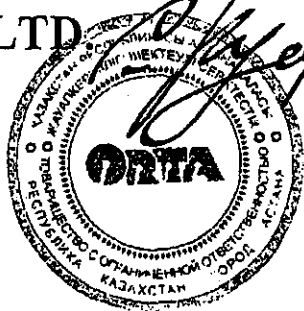
Astana City – 2002

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Director of ORTA LTD

 S. Rustambekov



Astana City – 2002

CONTENT

Documents for tender «Development of the model projects for town planning development of Astana City in the Republic of Kazakhstan»

1. Brief information about design company ORTA LTD.
2. Experience in the field of development of the similar projects for the last five years.
3. Curriculum vitae for the major specialists.
4. The list and scope of design works and their cost.
5. Schedule of work.

Company Profile
ORTA LTD.

Juridical name: ORTA LTD.

Form of property: private

Number of architects and engineers: 20 architects
30 engineers

Year of foundation: 1996

Average annual volume of design works: 80 mln. tenge

Address of the Central Office: Astana City, 473005,
30, Gastello St.
Tel.: 8 3172 371220
Fax: 8 3172 371420
e-mail: orda_akmola@nursat.kz

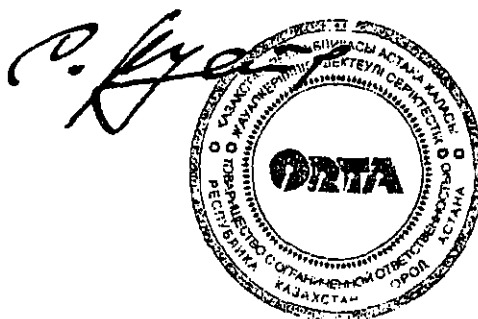
Contact persons at Astana City Rustambekov Serik, Director
8 3172 371184
mobile: 8 300 5111993

Address of the Representative Office at Almaty City Almaty City, 480100,
39, Kazybek Bi St.,
Tel.: 8 3272 918324
Fax: 8 3272 915885

Contact person at Almaty City Director Assistant
Sandybayev, Bahyt Kyrkybakovich
mobile: 8 300 340 5542

Licenses Throughout Kazakhstan
For all types of design works

S. Rustambekov
Director of ORTA LTD.



Experience in Development of Similar Projects during Previous 5 Years

- 1. *Reconstruction of Esil Embankment in Astana (general and detailed design)***
Client: Department for Administration of Astana Development Programs at the Akimat of Astana
Scope of works: The Central Part of the city including the new administrative center area:
- Right bank: 6.7 km
- Left bank: 6.2 km
Stabilization of the banks, embankments, channel clean-up and area improvement.
- 2. *Pedestrian - and- Recreational Area, and the Millennium Gallery in Astana (general and detailed design)***
Client: Department for Administration of Astana Development Programs at the Akimat of Astana
Scope of works: Area: 4 ha
Complex improvement, planting of greenery and development of a covered pedestrian gallery with a length of 150 m² and general area of 4800 m², engineering networks.
- 3. *Design of the detailed planning of the Central Park of Astana (schematic diagram)***
Client: Department for Administration of Astana Development Programs at the Akimat of Astana
Scope of works: Area: 80 ha
Development of the park planning scheme, area zoning, placement of the main objects and scheme of transport, pedestrian and engineering infrastructure.
- 4. *New square in Astana (general and detailed design)***
Client: Gorkomkhoz (Municipal Utility Enterprise)
Scope: Area: 3.5 ha
Complex area improvement, planting of greenery, creation of a pool with fountains and ornamental sculptures, and engineering networks.
- 5. *Reconstruction of the Central Square of Astana and its adjacent territory (general and detailed design)***
Client: Department for Administration of Astana Development Programs at the Akimat of Astana
Scope: Area: 8 ha
Complex improvement with flower beds, lawns, car parking places and electric lighting.
- 6. *Design of detailed planning for the linear park along Esil in Astana (schematic diagram)***
Client: Department for Administration of Astana Development Programs at the Akimat of Astana
Scope: Area: 300 ha

Development of planning scheme, zoning and design proposals for area improvement.

7. *Design for reconstruction of the square near the Residence of the President of the Republic of Kazakhstan (general and detailed design)*

Client: Administrative Department of the President of the Republic of Kazakhstan

Scope: Area: 3 ha
Complex area improvement, planting of greenery, electrical lighting, ground for solemn ceremonies and fence for the area.

8. *The State Recreational Camp "Baldauren" for children (300 beds) in Shuchinsk (general and detailed design)*

Client: The Ministry of Education of the Republic of Kazakhstan

Scope: Area: 8.5 ha
Design for the main building with a total area of 15,000 m². Complex area improvement with creation of an amphitheatre with 600 seats, sports grounds with stands for 200 seats, boating station and beach.

9. *Protection of Astana from flooding with Esil water (Feasibility Study)*

Client: Department for Administration of Astana Development Programs at the Akimat of Astana

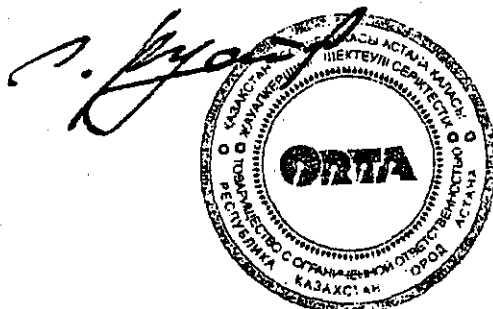
Scope: Technical and economical feasibility study for protection of Astana from flooding with Esil flood water on the basis of collation of 4 options of protection and proposal of a concrete scheme for protection with all required studies, calculations and drawings.

10. *Feasibility study for Protection of Esil left-bank area from underflooding with ground water (drainage)*

Client: Department for Administration of Astana Development Programs at the Akimat of Astana

Scope: Area: 5700 ha
Lowering of groundwater level, studies, selection and justification for the options of technical solution and calculation of construction costs.

S. Rustambekov
Director of ORTA LTD.



Designing-and-Research Company "ORTA" is a leading company in Kazakhstan in the field of development of different town building and design projects.

Head Office Location: Astana

Form of ownership: private

Within last four years the Company has fulfilled designs at the cost of 4.1 million USD in total, namely:

1. In 1996-1997 the master-plan of development of Astana for the period of up to the year 2015 was completed.

Its first stage was dedicated to the assessment of current situation on:

- Engineering (Topography, Geology, Hydrology etc);
- Ecology;
- Engineering and Transport Infrastructure;
- Industry and Construction;
- Social Aspects;
- Housing;
- History;
- Demography and Economics.

2. Based on the mentioned data the master-plan of development Astana up to 2005, was fulfilled in 1998 in frame of existing city borders. The layout of all development directions was submitted in accordance with provisions described in Paragraph 1.

3. In 1998 the Company partook in the international competition on sketch-design of a new city-center of Astana. It won the second prize after Japan out of 27 contestants.

4. In 1996-1998 the Company provided consulting services to potential foreign investors willing to invest in Kazakhstan such as Fitzpatrick (UK), AHSEL (Turkey), TechArt (Czech Republic), China, Japan, Switzerland, Islamic Development Bank etc.

5. In 1996-98 the Company accomplished the number of town-building designs of different parts of the city Astana while being a General Designing Company:

- Central part – 1000 hectares;
 - South-Eastern housing area – 800 hectares;
 - South-Western area – 500 hectares;
 - Central city park – 39 hectares;
 - Park adjacent to the river-side of ESIL (ISHIM) – 30 hectares.
6. In 1996-1998 the Company fulfilled working designs of individual construction projects in Astana such as:
- housing complex SAMAL of 718 apartments (project cost is 18 million USD);
 - “Millenium” shopping gallery with the space of 5000 square meters in total and landscaping of the lawn out of 4 hectares (project cost is 3million USD);
 - rehabilitation of ESIL riverside with the total length of 5 km (cost of 2 million USD);
 - renovation of CONGRESS-HALL (7 million USD);
 - restructuring of airport (12 million USD);
 - Department Store on MIRA St.;
 - renovation of NFA building from out of former ISHIM Hotel.
7. In 2000 new construction units have been set up in Astana based on designs fulfilled by Company as follows:
- new square with the fountain and walking lawn;
 - EUROPA-PALACE restaurant (renovation);
 - Business-Center;
 - Near Railway Square.

Projects under development:

- Aqua-Park set jointly with AO “ISPAT-KARMET”;
- Technical proposals (conceptual layout) on engineering infrastructure of left riverside of Astana;

- Conceptual suggestions on the danger of flooding of Astana from overspill of ESIL (ISHIM);
- Rescue -on-Water Station.

8. In 1999-2000 projects in other towns of Kazakhstan were fulfilled:

- renovation of city park in Atyrau;
- 50-room executive hotel in Zhanaozen (Western Kazakhstan);

9. In addition, the Company fulfilled working designs of a number of small units:

- private housing projects (1-2 level buildings);
- commercial and service areas, construction and renovation;
- external design of the city (Promotion, Advertising);
- maps of Astana for public organizations with the emphasis on specificity of each;

10. KARAGANDA GIIZ is a research organization which is a part of Company. It has 100 staff and equipped with modern technical wear and a laboratory. It fulfills the following works:

- Topography for town-building works; in the dimension of M 1: 10000, and M 1:2000 as well as for individual projects in M 1: 500 dimension;
- Geological works for town-building and other projects. The latter is important for specific Astana soil;
- Hydro-Geological and Hydrological observations;
- Testing of iron structures etc.

11. Company may attract more than 10 design organizations-partners, specialized in specific sectors of engineering infrastructure and located in other areas.

12. Company possesses a computer base equipped with modern programs, enabling operative designing and e-mail service.

Mr. Serik Rustambekov is President of Company. He is an honorable architect of Republic of Kazakhstan, a corresponding member of International Academy of Architecture of countries of the East, an official consultant of Japanese Research Group "JCA" in a company "KISE

KUROKAWA ASSOCIATED” on development of master-plan of Astana
for 2030.

CURRICULUM VITAE
Rustambekov, Serik Isayevich

Specialty	Architect
Education	Higher
Languages	Kazakh, Russian: excellent English, German: with a dictionary
Work experience	30 years
Qualification	- Extensive experience in the field of architectural and town planning projects - Experience in management of the design institute
Honorary titles	- Honoured Academician of the International Academy of Architecture of the Orient Architect of Republic of Kazakhstan - Professor of the Eurasian University named by L.N. Gumilev
Similar major design work	1. Master plan of Astana. 2. Left bank of Ishim river in Astana. 3. Central park in Astana. 4. Pedestrian recreational area gallery "Millenium" in Astana. 5. New square in Astana.

S. Rustambekov

Director of ORTA LTD.



CURRICULUM VITAE
Kamenchenko, Boris Nazarovich

Specialty	Hydraulic Engineer
Education	Higher
Languages	Russian: excellent Spanish: with the dictionary
Work experience	37 years
Qualification	Extensive experience in the field of design and operation of the water resources projects and construction supervision
Similar major design work	<ol style="list-style-type: none">1. Irrigation of agricultural areas in the Republic of Kazakhstan.2. Water reservoir in Karaganda region.3. Flood protection in Astana.4. Underground water protection in Astana.5. Riverside of Ishim river in Astana.

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Director of ORTA LTD.



CURRICULUM VITAE
Konysbay, Bolatbek Nurbekuly

Specialty	Town Planner
Education	Higher
Languages	Russian, Kazakh: excellent French, German: with the dictionary
Work experience	20 years
Qualification	Experience in the field of development of town planning documentary for the cities of Kazakhstan and a number of town planning projects.
Similar major design work	<ol style="list-style-type: none">1. Master plan in Semipalatinsk in the Republic of Kazakhstan.2. Central park in Astana.3. New square in Astana.4. Residential district for 10 000 habitants in Semipalatinsk.5. Riverside of Ishim river in Astana.

S. Rustambekov

Director of ORTA LTD.

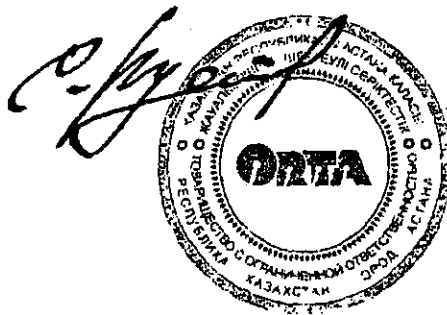


CURRICULUM VITAE
Zhanibek, Aydar Kabdollauly

Specialty	Landscape Architect
Education	Higher
Languages	Kazakh, Russian: excellent German: with a dictionary
Work experience	25 years
Qualification	Extensive experience in landscaping design and designing of parks and squares
Similar major design work	<ol style="list-style-type: none">1. Residential district №4, 5 in Pavlodar city of the Republic of Kazakhstan.2. Sport complex in Ekibastuz of the Republic of Kazakhstan.3. Reconstruction of the yard of the President's Resident in the Republic of Kazakhstan.4. Riverside of Ishim river in Astana.5. Reconstruction of the riverside in Pavlodar city.

S. Rustambekov

Director of ORTA LTD.



The list and scope of design works

No.	Type of work	Number of man-months	Unit price tenge/month	Sum (tenge)
1. General cost of design services				
Including:				
1.1.	Remuneration			
	Architect (No. 2)	4	313 000	1 252 000
	Town Planner (No. 2)	4	313 000	1 252 000
	Landscape Architect (No. 1)	2	313 000	626 000
	Transport Engineer (No. 1)	2	313 000	626 000
	Hydraulic Engineer	2	313 000	626 000
	Total for 1.1.			4 382 000
1.2.	Support staff			
	AutoCAD Operator (No. 2)	4	174 000	696 000
	Secretary (No. 1)	2	95 000	190 000
	Total for 1.2.			886 000
1.3.	Direct expenses			
	Personal computer (No. 6)	12	93 000	1 116 000
	AutoCAD equipment			2 670 000
	Transportation (1 car)	2	210 000	420 000
	Paper			526 000
	Total for 1.3.			4 732 000
	GRAND TOTAL			10 000 000
Total Cost (excluding VAT)				

S. Rustambekov

Director of ORTA LTD.



Schedule of work in Astana

	December		January		February		March	
	10	20	10	20	10	20	10	20
Design								
Development					████████████████████			
Specification							████████████████████	
Calculation Sheet							████████████████████	

Director of ORTA LTD.



S. Rustambekov

Attachment-6 Agreement for design works

FORM OF AGREEMENT

AGREEMENT

FOR

DESIGN WORK

FOR

THE URBAN DESIGN MODEL STUDY FOR THE DEVELOPMENT
OF THE CITY OF ASTANA IN THE REPUBLIC OF KAZAKHSTAN

This Contract made entered into 19 day of Jan, 2003 by and between the JICA Study Team for the Urban Design Model Study for the Development of the City of Astana in the the Republic of Kazakhstan organized by KISHO KUROKAWA architect & associates (hereinafter referred to as "Client" which shall include its legal successors and assigns), having its Head Quarter Office at 11F.Aoyama Bldg, 1-2-3, Kita Aoyama, Minato-Ku, Tokyo, Japan 107-0061 and ORTA LTD. (hereinafter referred to as "the Contractor" which shall include its legal successors and assigns), having its principal office at Astana City, 473005, 30, Gastello St., Kazakhstan.

WITNESSETH that the parties covenant, promise, and agree each with the other as follows:

- (1) The Contractor agrees to do and complete the Design Work (hereinafter referred to as "the Works") in accordance with the terms, conditions and requirements of this Contract.
- (2) The JICA Study Team for the Urban Design Model Study for the Development of the City of Astana in the the Republic of Kazakhstan agrees to pay the Contractor in consideration of the fulfillment of the Works, the Contract Price in Tenge Ten Million only (KZT 10,000,000) in accordance with the terms and conditions specified in Clause 1.12 of General Conditions.

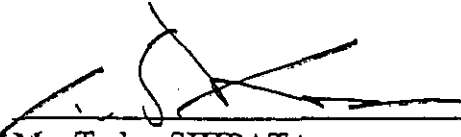
It is agreed that the terms, conditions and requirement of the Contract shall prevail except to the extent that they are expressly modified or altered by this Contract.

Spencer

JS

IN WITNESS WHEREOF, each of the parties hereto has caused this Contract to be executed in duplicate as of the date first above written by its duly authorized representative.

FOR AND ON BEHALF OF
JICA STUDY TEAM



Mr. Tadao SHIBATA
Team Leader,
JICA Study Team for the Urban
Design Model Study for the
Development of the City of Astana
in the Republic of Kazakhstan

FOR AND ON BEHALF OF
THE CONTRACTOR


Mr. Serik Isaevich RUSTEMBEKOV
Director
ORTA LTD.


GENERAL CONDITIONS

1.1 Definitions

The following words and expressions shall have the meaning assigned to them, except where the context otherwise requires:

- a) "JICA" shall mean Japan International Cooperation Agency, the official agency responsible for the implementation of the technical cooperation of the Government of Japan having an address of its head office at:

Shinjuku Maynds Tower Bldg.,

1-1, Yoyogi 2-chome,

Shibuya-ku, Tokyo, 151 Japan.

- b) The "JICA Study Team" shall mean a person or persons appointed by JICA to supervise the Works at the Site and/or in other places in the Republic of Kazakhstan, where the Contract has to be carried out or is in progress to be carried out.
- c) The "Client" shall mean the JICA Study Team having its office, at an address of at Kisho Kurokawa Architect & Associates, 11F. Aoyama Bldg, 1 - 2 - 3, Kita Aoyama, Minato-Ku, Tokyo, Japan 107-0061, and shall include its legal successors and assigns.
- d) The "Contractor" shall mean any person, firm or company whose tender has been accepted by the Client (and approved by JICA), and shall include the Contractor's personnel representative, its legal successors and assigns.
- e) The "Contract" shall mean the agreement between the Client and the Contractor for execution of, and payment for the Works as defined in the Contract Documents.
- f) The "Works" shall mean the works for the Design Work for the Urban Design Model Study for the Development of the City of Astana in the Republic of Kazakhstan to be done by the Contractor under the Contract.
- g) The "Contract Price" shall mean the sum named in the Contract as the contract price.
- h) The "Unit Price" shall mean the unit price stated in the Payment Schedule attached to the Contract.



- i) The "Project" shall mean Urban Design Model Study for the Development of the City of Astana in the Republic of Kazakhstan.
- j) The "Site" shall mean the places of the area in which the Works for the Project are to be executed.
- k) "Day, Week, Month, Year" shall mean calendar day, calendar week, calendar month and calendar year.
- l) "Writing" shall mean any manuscript, type written or printed statement under seal or hand.

Words importing the singular only also include the plural and vice versa where the context requires. The fact that the words defined in this Clause are or are not capitalized in the Contract shall not effect their meaning.

1.2 Contractor to Inform Himself Fully

The Contractor by tendering shall be deemed to have satisfied himself as to all the conditions and circumstances affecting the Contract Price, and to have fixed these prices according to his own view for these as no additional allowances, except as otherwise expressly provided, will afterwards be made beyond the Contract Price. The Contractor shall be responsible for any misunderstanding or incorrect information, however, obtained except information given in written by the Client.

1.3 Effective Date of Contract and Commencement of the Works

The Contract shall be effective on the date when the Contract has been approved by JICA. The Contractor shall commence the Works upon receipt of "Notice to Proceed" which will be issued by the Client.

1.4 Manner of Execution

- a) All the Works to be done under the Contract shall be executed in accordance with the Specification, or where not specified therein in accordance with such instructions and orders as the Client may give.
- b) If the Contractor shall, by written notice to the Client within seven (7) days after receiving any decision, instruction or order of the Client, intimate that he disputes or questions the decision for so doing, either party shall be liberty to refer the matter to arbitration pursuant to Clause 1.23 Arbitration of the General Condition, but such and intimation shall not relieve the Contractor of his obligation to proceed with the works in accordance with the decision, instruction, or order in respect of which the intimation has been given.

1.5 Information and Official Permission

- a) The Client shall make available to the Contractor, at request of the Contractor, general information and site conditions related to Works, but the Contractor shall be responsible for his own interpretation thereof.



- b) Official permission from the authorities concerned for the execution of the Works at the Site shall be arranged by the Contractor at his own expenses.
- c) The Contractor shall arrange by himself so that the Contractor may have free access to land required in performing the Works, whether they may be under the ownership of the Government of Kazakhstan or the third parties, and shall assume liability of damage to lands and associated properties due to such access, unless such damage caused by negligence or fault of the Contractor shall be indemnified by the Contractor.

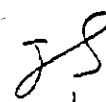
1.6 Contractor's Representative and Persons

- a) The Contractor shall make his own arrangements for the engagement of all the engineers, technicians, survey specialists and surveyors necessary for the execution of the Works. The Contractor shall submit to the Client for approval a complete list of principal staff showing names, functions, personal histories and periods of assignments prior to commencement of the Works.
- b) The Contractor shall appoint one or more competent representatives from among the Contractor's professionals assigned to the survey to superintend the carrying-out of the Works at the Site. The names, training and experience of the Contractor's representatives shall be submitted to the Client for approval before they are appointed. The said representative, or if more than one shall be appointed, then one such representative shall be present on the Site during working hours, and any orders or instructions which the Client may give to the said representative of the Contractor shall be deemed to have been given to the Contractor by the Client.
- c) The Contractor shall be responsible for observation of all regulation and safety precautions imposed by labor legislation and authorities in Kazakhstan.
- d) The Client shall be at liberty by notice in writing to the Contractor to object to any representative or other person employed by the Contractor in the execution of the Works who shall, in the opinion of the Client, misconduct himself or be incompetent or negligent or be sick and the Contractor shall remove such person from the Works and provide an acceptable replacement for such person at the Contractor's expense.

1.7 Working Days and Hours

The Contractor shall carry out the Works on the Site continuously during the normal working hours generally recognized in the Government of Kazakhstan. The Contractor may, with the arrangement of the Client, carry out work at other time if it shall be practicable in the circumstances for work to be so done.

1.8 Materials, Equipment and Facilities to be Provided by the Contractor



- a) The Contractor shall at his own expense supply and provide all the equipment, materials and labor and other things or every kind required for the execution and completion of the Works.
- b) The Contractor at his own expense provide the following temporary facilities necessary for the execution of the Works:
 - 1) Office at the Site required in performing the Works,
 - 2) Temporary lodging accommodation at the Site, and
 - 3) Other facilities at the Site, if necessary.

1.9 Program to be Furnished

- a) The Contractor shall submit to the Client, for his approval, his proposed time schedule and field operation program for each section of the Works. After approval by the Client of such time schedule and field operation program, the completion time for the Works: stipulated in the same time schedule shall be considered as "Guaranteed Time for Completion of the Works", and the Contractor shall adhere to the order of procedure, method and time schedule unless he obtains the written permission of the Client to vary such order or method or time schedule.
- b) In the course of the Works, when the Client calls the Contractor for meeting, the Contractor and/or his representatives shall at any time and at his own expense attend the meeting and shall report all actual state of Works.

1.10 Insurance

- a) The Contractor shall at his expense effect accident and insurance for engineers, technicians, survey specialists and surveyors employed by the Contractor for the execution of the Works, and shall keep the Client free from any claim for the compensation of such accident and injury.
- b) The Contractor shall at his expense insure the equipment, materials and facilities to be provided by the Contractor and keep each part thereof insured for its full value against loss, damage and fire.

1.11 Force Majeure

- a) If either party is temporarily unable by reason of force majeure or the law or regulation of to meet any of its obligation under the Agreement, and if such party gives to the other party written notice of the event within fourteen (14) days after its occurrence, such obligations of the party as it is unable to perform by reason of the event shall be suspended for as long as the inability continues.
- b) Neither party shall be liable to the other party for loss or damage sustained by such other party arising from any event or delay arising from such event.



- c) The term "Force Majeure" as employed herein shall mean Act of God, Strikes, lock-outs or other industrial disturbances, acts of the public enemy, wars, blockades, earthquakes, storm, lightning, floods, washouts, civil disturbances, explosion, and any other similar event, beyond the control of either party.

1.12 Terms of Payment

- a) The payment for the Works shall be made by the Client to the Contractor in the following manner:
- 1) The Contractor shall submit their invoice approved by the Client for the actual work performed by the Contractor.
 - 2) The amount of such invoice shall be paid by the Client to the Contractor in the Kazakhstan's local currency unit of Tenge within ten (10) days after the Client is in receipt of the Contractor's invoice based on the following two installments:
 - i) At commencement of the Works, 40% of the Contract Price,
 - ii) The remaining 60% of the contract as the final payment above shall be paid by the Client to the Contractor within ten (10) days after the submission of the Final Report.
- b) No extra payments in respect of overtime, holiday works, additional equipment, materials and facilities, or special conditions of hardship shall be claimed by the Contractor beyond the Contract Price, unless such payment shall have been authorized in writing by the Client prior to the extra cost concerned being encountered.
- 1) If upon completion of the Works the actual total quantities so finalized differ from the estimated quantities set out the Contract, or if there should arise an increase or decrease in the Contract Price from any causes, then and in such a case an equitable adjustment shall be made to the Contract Price by mutual written agreement between the Client and the Contractor in accordance with the provisions of the Contract.
 - 2) Unit prices stated in the Payment Schedule shall be fixed and shall be used in determining any adjustment to the Contract Price where applicable.
 - 3) Any fluctuation in the prices of wages, materials or any other things shall not be the subject of any adjustment.

1.13 Taxes and Related Charges

All the income and other taxes, levies, imposes, deductions, charges, fees and similar assessments whatsoever imposed, assessed, levied or collected by the Government of Kazakhstan, or any sub-divisions thereof or any taxing authority therein, upon the Contractor and his staff shall be paid and/or borne by the Contractor.



1.14 Variations and Omissions

- a) The Contractor shall not alter any of the Works except as directed in writing by the Client. The Client shall have full power, from time to time, during the execution of the Contract, to direct the Contractor to alter, amend, omit, add to or otherwise vary any of the Works, by notice in writing and the Contractor shall carry out such variations. In case the Client directs, on the spot, the Contractor to change the area to be investigated from the originally proposed areas, the Contractor shall at that instance obey such directions and later obtain written confirmation from the Client.
- b) If decrease in the Works is ordered by the Client, such orders shall not constitute any ground from claim for damage or loss of anticipated profits on the Survey.

All extra additional Works shall be performed with the same materials and workmanship as employed for the Works of similar character in the original one as far as they are applicable thereto.

- c) The Contract Price fixed in the Contract, if any, occasioned by such variations, shall not be adjusted from the Contract Price.

1.15 Contractor's Default

- a) If the Contractor shall neglect to execute the Works with the diligence and expedition or shall refuse or neglect to comply with any reasonable instructions or orders given in writing by the Client in connection with the Works, or shall contravene the provisions of the Agreement, the Client may give notice in writing to the Contractor to make good the failure, neglect or contravention complained of.
- b) Should the Contractor fail to comply with the notice within a reasonable time from the date thereof, then and in such case the Client shall be at liberty to employ other workmen and forthwith execute such part of the Works as the Contractor may have neglected to do, or, if the client shall think fit, it shall be lawful for him, without prejudice to any other right he may have under the Contract, to make the Works wholly or in part out of the Contractor's hands and re-contract with any other person or persons to complete the Works or any part thereof.
- c) The Client shall be entitled to retain and apply any balance which may be otherwise due by him to the Contractor, or such part hereof as may be necessary to payment of the cost of executing the said part of the Works or completing the Works as the case may be. If the cost of completing the Works or executing part thereof as aforesaid shall exceed the balance due to the Contractor, the Contractor shall pay such excess upon request writing from the Client.



1.16 Rejection

If at any time before the Works are accepted by the Client, the Client shall decide that any work done by the Contractor is defective or not in accordance with the Contract or that the Works or any portion thereof are defective or do not fulfill the requirements of the Contract, then the Contractor shall with all speed and at his own expense make good defects so specified. In case the Contractor shall fail so to do, the Client may, provided he does so without undue delay, take at the cost of Contractor, such steps as may in all the circumstances be reasonable to make good such defects.

1.17 Time for Completion

- a) The whole of the Works shall be completed by 15th of March, 2003. Extended time from the time for completion may be allowed under the following paragraph.
- b) The Contractor shall not be held responsible for failure to carry out his obligations in case of force majeure, such as embargo, blockade, war, natural disasters or any disaster or any circumstances beyond his reasonable control. The Contractor shall notify the Client in writing within fourteen (14) days of the commencement of force majeure conditions. Depending on the production of satisfactory evidence and if the existence of force majeure conditions is accepted by the Client, the Client will grant extension of the Guaranteed Time for Completion of the Works sufficient to compensate for delay due to force majeure without penalty.

1.18 Delay in Completion

If the Contractor fails to complete the Works in accordance with the Contract within the time fixed by the Contract, there shall be deducted from the Contract Price as and for liquidated and ascertained damages a sum of money equal to half (1/2) percent of the Contract Price for each day between the Guaranteed Time for Completion of the Works and the actual date of completion but the amount so deducted shall not in any case exceed five percent (5%) of the Contract Price. Such deduction shall be in full satisfaction of the Contractors liability for the said failure.

The Client may request the Contractor to employ additional labor or use additional equipment and materials and the Contractor will do so at his expense in case a delay in the completion of the works has to be expected.

1.19 Suspension of the Works

The Contractor shall, on the written order of the Client, suspend the progress of the Works or any part thereof for time or times and in such manner as the Client may consider necessary and shall be doing such suspension properly protect and secure the Works so far as is necessary in the opinion of the Client. All expenses incurred by the Contractor by reason of the suspension of the Works by the Client will be at the sole responsibility of the Contractor if the suspension is:



- a) Otherwise provided for the Contract, or
- b) Necessary for the proper execution of the Works or by reason of weather conditions affecting the safety or the quality of the Works or by some defaults on the part of the Contractor, or
- c) Necessary for the safety of the Works or any part thereof.

1.20 Certificate of Completion of the Works

As soon as in the opinion of the Client, the whole of the Works shall have been satisfactory completed, the Client shall issue a Certificate of Completion of Works after receiving a written application thereof. Upon issuance of such Certificate of Completion of Works, the Contractor shall cease to be under further obligation under the Contract.

1.21 Bankruptcy

If the Contractor shall become bankrupt or insolvent or have a receiving order made against him, or compound with his creditors, or being a corporation, commence to be wound up, not being a member's voluntary winding up for the purpose of amalgamation or reconstruction, or carry out its business under a receiver for the benefit or its creditors or any of them, the Client shall be at liberty:

- a) To terminate the Contract forthwith by notice in writing to the Contractor or to the receiver, or liquidator, or to any person in whom the Contract may become vested, and to act in the manner provided in Clause 1.15 of the Contractor's Default, as though the last mentioned notice has been the notice referred to in such Clause and the Works has been taken out of the Contractor's hand, or
- b) To give such receiver, liquidator or other person the opinion of carrying out the Contract subject to his providing a guarantee for the due and faithful performance of the Contract up to an amount to be agreed.

1.22 Assignment and subletting of the Contract

The Contractor shall not, without the prior consent in writing of the Client, assign or transfer the Works or the benefits or obligations thereof or any part thereof to any other persons. The Contractor shall not, without the prior consent in writing of the Client, which shall not be unreasonably withheld, sublet the Contract or any part thereof or make any sub-contract with any person or persons.

Any such consent if given shall not relieve the Contractor from his obligations under the Contract. The Sub-Contractor shall be regarded as employee of the Contractor. The Contractor shall be solely responsible for the performance of the sub-contractor and for all payments to the sub-contractor.

1.23 Arbitration



- a) If any dispute or difference of any kind whatsoever shall arise between the Client and the Contractor in connection with the interpretation of application of the Contract, it shall be settled as much as possible by amicable arrangement between both parties. If such arrangement cannot be realized, the dispute or difference shall be settled by arbitration as provided herein.
- b) All questions, disputes or differences arising out of or in relation to the interpretation of the Contract which cannot be settled by mutual accord shall be submitted to a committee for arbitration consisting of three arbitrators, one to be nominated by the Client, another by the Contractor and the third as chairman by the two mentioned arbitrators above, and shall be finally settled in conformity to the rules and procedures of Conciliation and Arbitration of the International Chamber of Commerce. Such arbitration shall be held at such place and time in the Kazakhstan as the arbitrators may decide.

Any decision, opinion, direction, certificate or valuation given by the arbitrators shall be obeyed by both parties and be final.

1.24 Notice and Correspondence

Any notice to be given to the Contractor shall be served by sending the same by facimile or e-mail to or leaving the same at the Contractor's principal place of business, or to the address of his representative at the Site. Any notice to be given to the Client shall be served by sending the same by post to or leaving the same at the Client address as stated in the Contract.

1.25 Documents

- a) All the correspondences, figures, drawings and other documents shall be made in the English and Russian languages.
- b) The several documents have to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be adjusted in accordance with the provisions of Clause 1.23 hereof.

1.26 Inspection of Work

The Client shall at all times have access to the Works wherever it is in preparation or progress and the Contractor shall provide necessary facilities for such access and for inspection.

Where the specifications require any work to be specially tested or approved, the Contractor shall give the Client timely notice of his readiness for inspection and, if the inspection is by an authority other than the Client, of the date fixed for such inspection.

1.27 Interpretation

All general language or requirements embodied in the specifications are intended to amplify, explain and implement the requirements of this Contract. However, in the



event that any language or requirements so embodied permit an interpretation inconsistent with any provision of this Contract, then in each and every such event, the applicable provisions of this Contrat shall prevail and govern.

In the event that any language or requirements of the Contract Documents, correspondences, figures, drawings, and other documents prepared in the course of the Works have an interpretation inconsistent between the English and Russian languages, the documents in the English language shall prevail and govern.

Copy sent

JS

SPECIFICATIONS
FOR
DESIGN WORK
FOR
THE URBAN DESIGN MODEL STUDY FOR THE DEVELOPMENT
OF THE CITY OF ASTANA IN THE REPUBLIC OF KAZAKHSTAN

1. Background

The Study on the Master Plan for the Development of the City of Astana (hereinafter referred to "the Master Plan") was completed by the Japan International Cooperation Agency (hereinafter "JICA") in June 2001. It was approved by the Government of the Republic of Kazakhstan in August in the same year.

Capital Development Corporation (CDC) and Department of Architecture and Urban Planning of Astana Municipality has agreed with JICA to execute the Urban Design Model Study for the Development of the City of Astana in the Republic of Kazakhstan (hereinafter referred to "the Study"). It is intended to conduct samples of urban design work at detail design level to show and guide the subsequent implementation of the urban development in compliance with the concepts and principles formulated in the Master Plan.

The Study has been entrusted to the JICA Study Team headed by Mr. Tadao SHIBATA, Senior Managing Director, KISHO KUROKAWA architect & associates. The JICA Study Team intends to subcontract the design work (hereinafter referred to "the Design Work") to local design consultants of the Republic of Kazakhstan with experiences and capabilities for such detail design work under the management and guidance in new technologies by the JICA Study Team.

2. Objective of the Design Work

The objectives of the Design Work are to establish samples of urban design models to be followed in the development of the Astana City in consideration with the authenticity, ecological factors, and future introduction of new technologies yet unknown to Kazakhstan.

3. Scope of the Design Works

In order to implement the concepts and principles of the Master Plan, it is



deemed indispensable to carry out detail design of representative facilities in a small and typical block or site to be followed in the subsequent extensive urban development. The major points concerned are the following;

- 1) Covered pedestrian foot-path connecting buildings and parking systems within the Government City

Considering the severe climate of Astana, it is necessary to project all-weather foot-paths between major facilities planned in the new city center on the left bank of the Ishim river. "Barrier free" concept in urban designing is a new approach in Kazakhstan. A total pedestrian network composed of covered overpasses, underpasses, "Barrier free" pavements and doorways should be designed in the selected model block.

- 2) Linear citizen's park in Government City together with a special lane for electrical-operated shuttle bus system

The existing trolley bus system is too old and unfriendly to handicapped people because of high floor level, narrow step and the distance between bus stop and bus stopping positions. A fare collection by conductor is inefficient especially in the rush hour. Proposed shuttle bus and bus stop design should provide measures to meet this situation as a future transport model.

- 3) Residential neighborhood (one block) of a residential complex with a patio type of closed inner space as a countermeasure for the severe weather of Astana

New residential buildings should be well adapted to the severe winter climate with low temperatures and strong winds not limited to the uniform standard architecture of Soviet period. The energy-saving factors such as cogeneration, solar cell and wind power is also to be studied considering strong summer sunshine and full use of the windmill early in the 20th century.

- 4) Landscaping along the Ishim river

The Ishim river is, except for spring rising period, a narrow "steppe river" with thick reed and forming a core of the ecosystem in Astana. Easy expansion of the width and concrete shore protection could cause water pollution. Both of the landscaping suitable for the new capital and characteristic nature of the steppe should be considered in a landscaping plan and a near-natural shore protection design.



4. Outputs

- 1) Covered pedestrian foot-path connecting buildings and parking system within the Government City
 - a) Typical Network Plan for the Pedestrian Footpath (Drawings),
 - b) Typical Public Parking System (Drawings),
 - c) Typical Vertical Section for the Pedestrian Footpath (Drawings),
 - d) Perspective, and
 - e) Outline Description.
- 2) Linear citizen's park in Government City together with a special lane for electricity-operated shuttle bus system
 - a) Transportation System for the Shuttle Bus System (Drawings),
 - b) Typical Plan for the Linear Citizens' Park (Drawings),
 - c) Typical Bus Stop Facility Plan (Drawings),
 - d) Typical Bus Stop Elevation (Drawings),
 - e) Typical Bus Stop Section (Drawings),
 - f) Perspective, and
 - g) Outline Description.
- 3) Residential neighborhood (one block) of residential complex with a patio type of closed inner space as a countermeasure for the severe weather of Astana
 - a) Typical Plot Plan (Drawings),
 - b) Typical Floor Plan (Drawings),
 - c) Typical Elevation (Drawings),
 - d) Typical Section (Drawings),
 - e) Typical Unit Plan (Drawings),
 - f) Parking Garage System (Drawings)
 - g) Perspective, and
 - h) Outline Description.
- 4) Landscaping along the Ishim river
 - a) Typical Landscape Plan (Drawings),
 - b) Typical Vertical Section (Drawings),
 - c) Functional Plan for the Eco System & Biotope (Drawings),
 - d) Similar Example (Photo),
 - e) Perspective, and
 - f) Outline Description.



5. Outputs

The language to be used in the drawings, specifications, and other documents shall be the English and Russian languages. The documents in the English language shall prevail and govern, if there is an interpretation inconsistent between documents in the English and Russian languages.

6. Submission

Drawings and documents shall be submitted to the JICA Study Team in the following numbers;

- 1) Design drawings, specifications, and related documents: 7 sets
- 2) All drawings shall be prepared by CAD. The specifications and documents together with the design drawings shall be filed in CD-ROM and one set shall be submitted to the JICA Study Team.

7. Work Schedule

All the above works shall be completed by 15th of March, 2003 after the completion of schematic design ,around 20 January 2003.



8. Bill of Quantities

Work items and quantities of the Design Work are shown in the table below.

BILL OF QUANTITIES

No	Work Item	Quantity	Unit Price Tenge/month	Amount (Tenge)
1.	Design Fee			
(1)	Remuneration			
	Structural engineer		MM	
	Electrical engineer		MM	
	Mechanical engineer		MM	
	Traffic engineer		MM	
	Landscaping architect		MM	
	Sub-Total		MM	
(2)	Supporting staff			
	CAD operator		MM	
	Secretary		MM	
	Sub-Total		MM	
(3)	Direct expense			
	Personal computer	LS		
	CAD equipment	LS		
	Transportation	LS		
	Paper	LS		
	Sub-Total			
Total Cost (excluding VAT)				

Official

JS

9. Work Schedule

In making the chart presented below, issuance of notice to proceed by the JICA Study Team is to be assumed at the middle of January, 2003.

Work Items	Year of 2003					
	January		February		March	
Schematic design						
Design development						
Specifications						
Calculation sheets						

(Signature) _____

(Name of Authorized Representative)

(Position)

For and on behalf of (Name of the firm)




Attachment-7 Weather data of Astana city

for B)-3.
Local climate
data

Проектно-строительная компания
"Ак Орда"

General Plan of Akmolu

Генеральный план г. Акмола

Analysis of the current situation

Анализ сложившегося состояния.

Construction climatic passport (description) of Akmolu
Строительно-климатический паспорт города Акмола.

Volume I. Chapter 4

Том I. Книга 4.

Explanation note

Пояснительная записка.

г. Акмола. 1997г.

Введение:

В Казахстане строительно - климатической паспортизацией для целей планировки и застройки города Алматы в свое время занимались институты - "Казгорстройпроект", "Казгипроград". "Алматыгенплан". Для города Акмола строительно - климатический паспорт выполнен впервые.

Строительно - климатический паспорт города Акмола разработан с учетом методологии ЦНИИП градостроительства России. Исходные данные для его разработки взяты из гидрометеорологического справочника (Гидрометеорологическая обсерватория, Целиноград). Архитектурный анализ, инженерно - климатические расчеты выполнены в соответствии рекомендаций предложенных в специальной литературе.

В состав строительно - климатического паспорта вошли следующие данные:

- общие данные;
- солнечная радиация (прямая солнечная радиация на нормальную к лучу поверхность, прямая солнечная радиация на горизонтальную поверхность - при ясном небе, при средних условиях облачности);
- температура (среднемесячная и годовая, средняя максимальная, средняя минимальная, термическая роза ветров в январе, термическая роза ветров в июле);
- влажность и облачность;
- атмосферные явления (количество дней в году с туманом, метелью, пыльной бурей, гололедом);
- осадки (количество осадков, объемы снегопереноса);
- ветровой режим (роза ветров, повторяемость различных градаций скоростей ветра, годовой ход дней с ветром >15 м/сек., ветровой дискомфорт);
- комплексная оценка (воздействия ветра и температуры воздуха на жилую среду, повторяемость и продолжительность различных типов погод, данные наблюдений за процессом аридизации в зоне размещения города);
- закономерности аэрации городской территории;
- основные климатические показатели;
- основные градостроительные мероприятия.

Строительно - климатический паспорт выполнен в составе генерального плана города Акмола, разработанного Проектно - строительной компанией "Ак Орда" в 1997 году.

Общие данные:

город расположен в 1В климатическом подрайоне

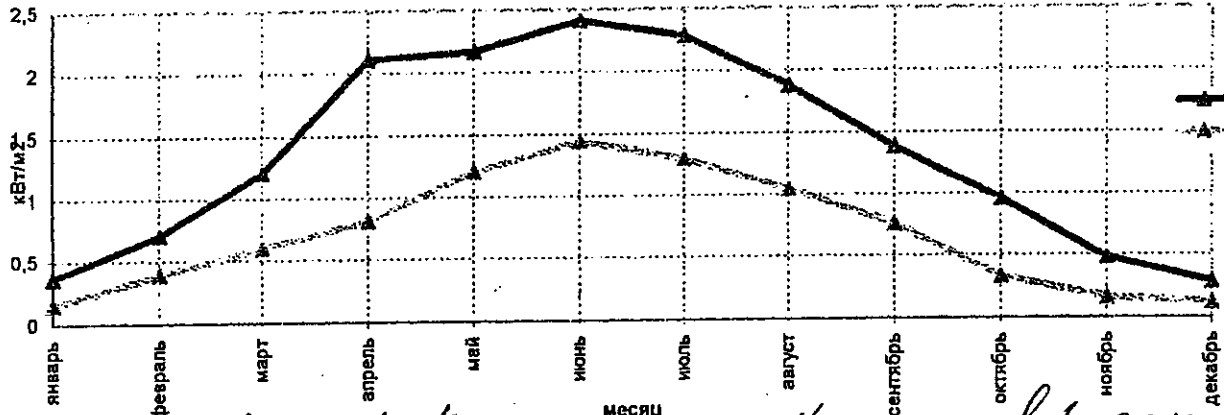
- продолжительная холодная зима с устойчивым снежным покровом, умеренно жаркое лето;
- большие годовые и суточные колебания температуры воздуха;
- большая повторяемость метелей, пыльных бурь, туманов;
- дискомфортные условия по комплексу факторов характерны для холодного периода года

/ в зимний период года выше критических по физиолого - гигиеническим критериям и условиям снегопереноса являются скорости ветра западных и южных направлений - соответственно 6,2 и 5,6 м/сек;

в летний период года повторяемость скоростей ветра >6 м/сек. является дискомфортной по физиолого - гигиеническим критериям и пороговой для пылепереноса/.

solar radiation
 солнечная радиация
solar radiation energy on horizontal surface

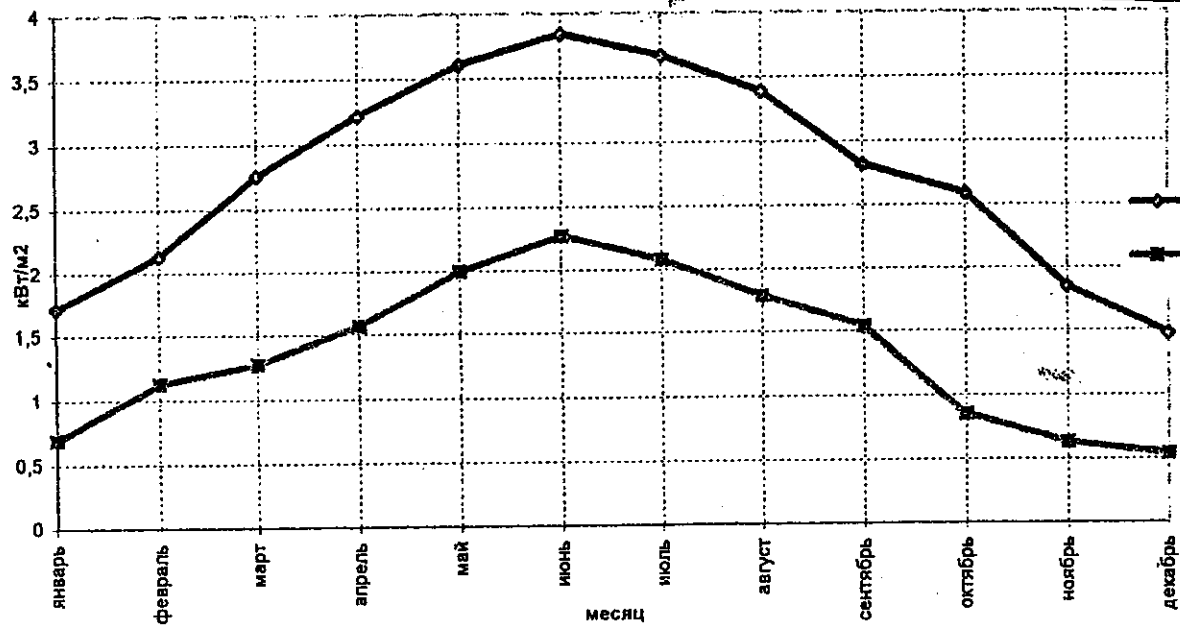
а - энергетическая освещенность солнечной радиацией на горизонтальную поверхность



under clear sky
 ПРИ ЯСНОМ НЕБЕ
 ПРИ СРЕДНИХ УСЛОВИЯХ ОБЛАЧНОСТИ
under average cloudiness

solar radiation energy on the normal to ray surface

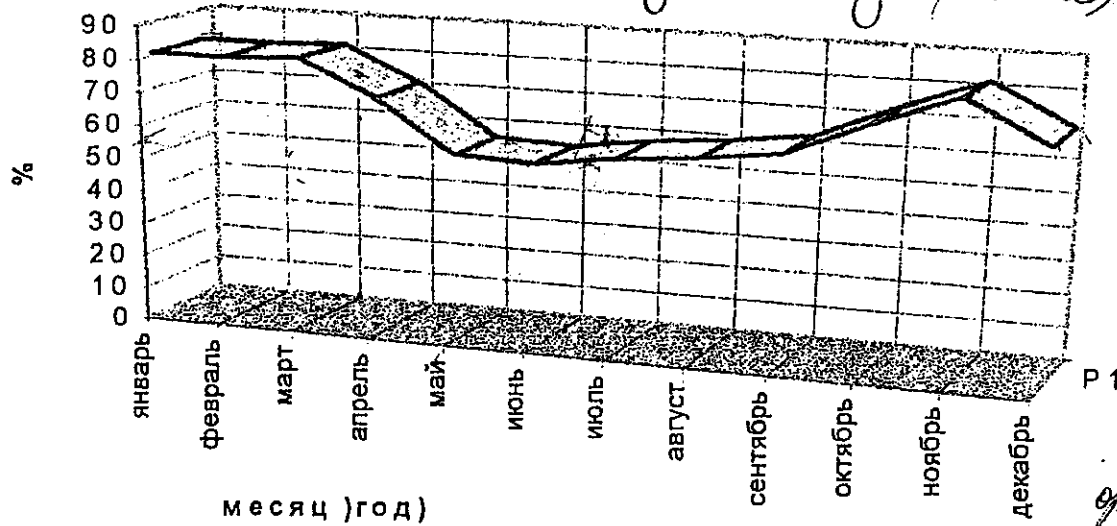
б - энергетическая освещенность солнечной радиацией на нормальную к лучу поверхность



under average conditions of cloudiness and clear sky
 ПРИ СРЕДНИХ УСЛОВИЯХ ОБЛАЧНОСТИ ПРИ ЯСНОМ НЕБЕ
 ПРИ СРЕДНИХ УСЛОВИЯХ ОБЛАЧНОСТИ
under average conditions of cloudiness

Годовой ход относительной влажности (средние значения)

relative humidity (average value)



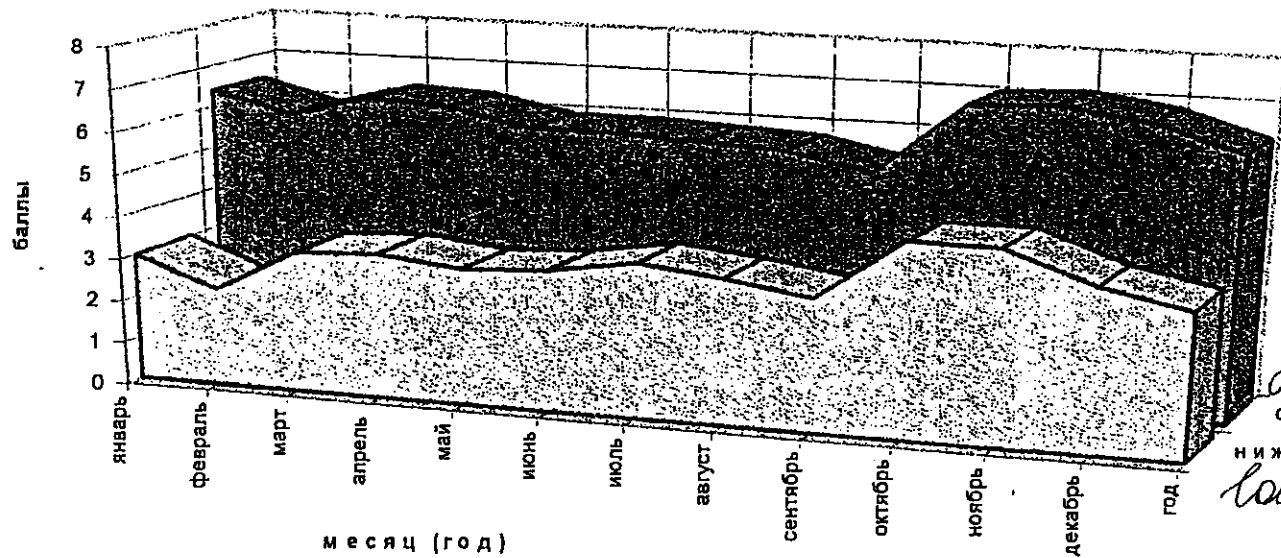
P 1

optimal humidity

оптимальная влажность

Average monthly & annual quantity of cloudiness (grades)
 Среднее месячное и годовое количество облачности (баллы)

50-70%



general cloudiness

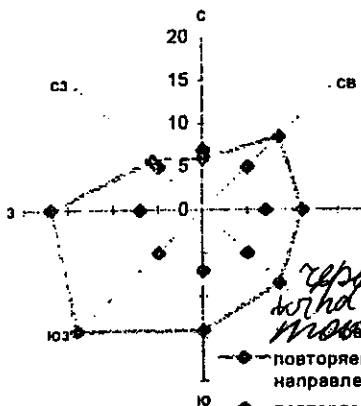
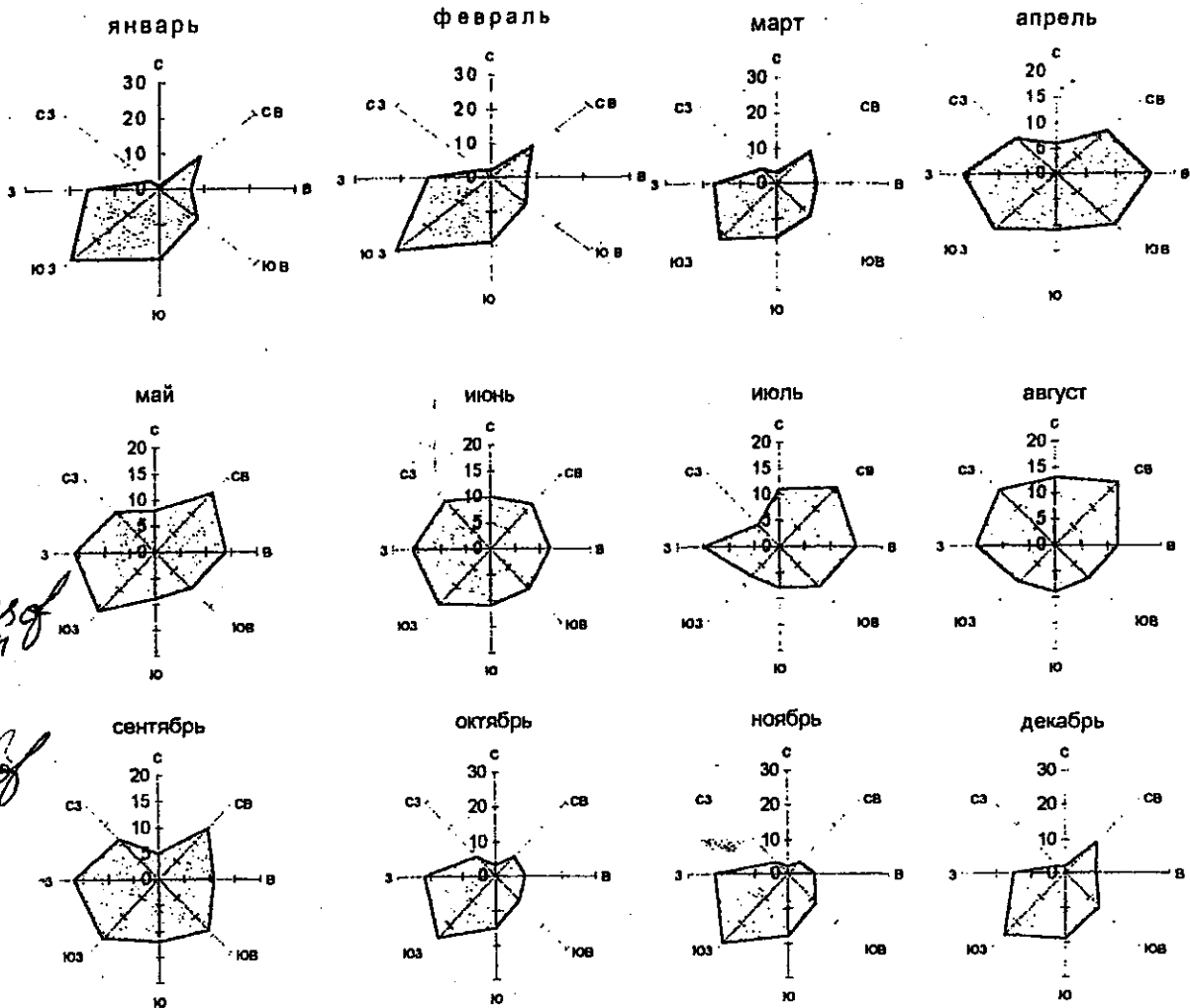
общая облачность

нижняя облачность

low cloudiness

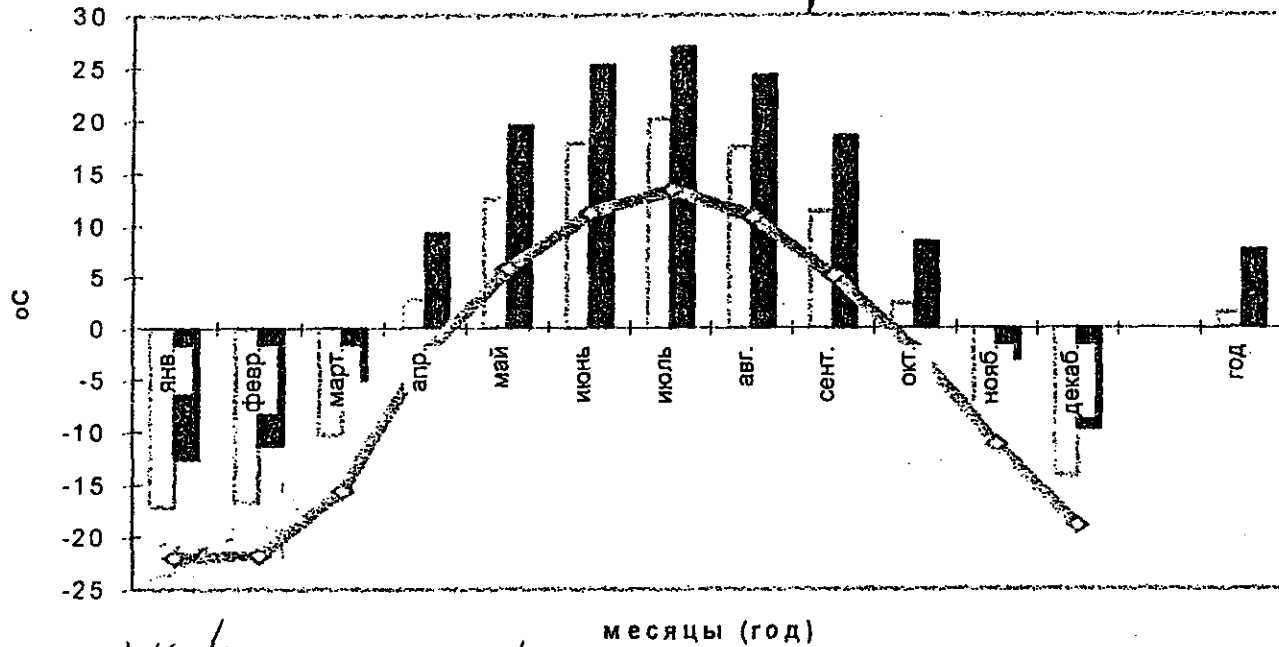
Роза ветров (повторяемость направлений ветра в %)
repeatedness of wind direction movement

year
ГОД



repeatedness of wind direction movement
 —●— повторяемость направлений ветра
 - - -●- - - повторяемость штилей?

Температура Temperature



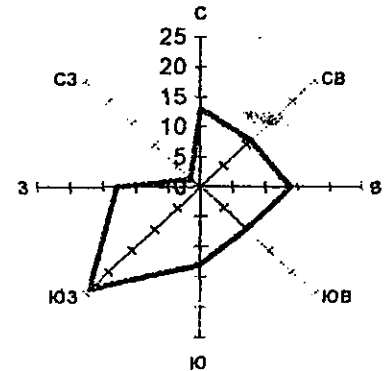
average monthly and annual

———— среднемесячная и годовая
average max
 ■■■■■ средняя максимальная
average min
 - - - - - средняя минимальная

— 145 —

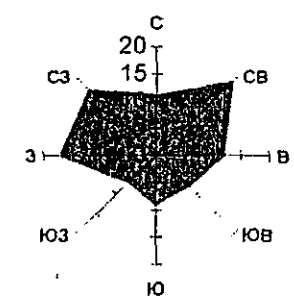
Winds

Термическая роза ветров, ЯНВАРЬ (%) (минусовая температура воздуха t x на повторяемость ветров в %) *air temperature t below 0 t x wind repeathness in %*



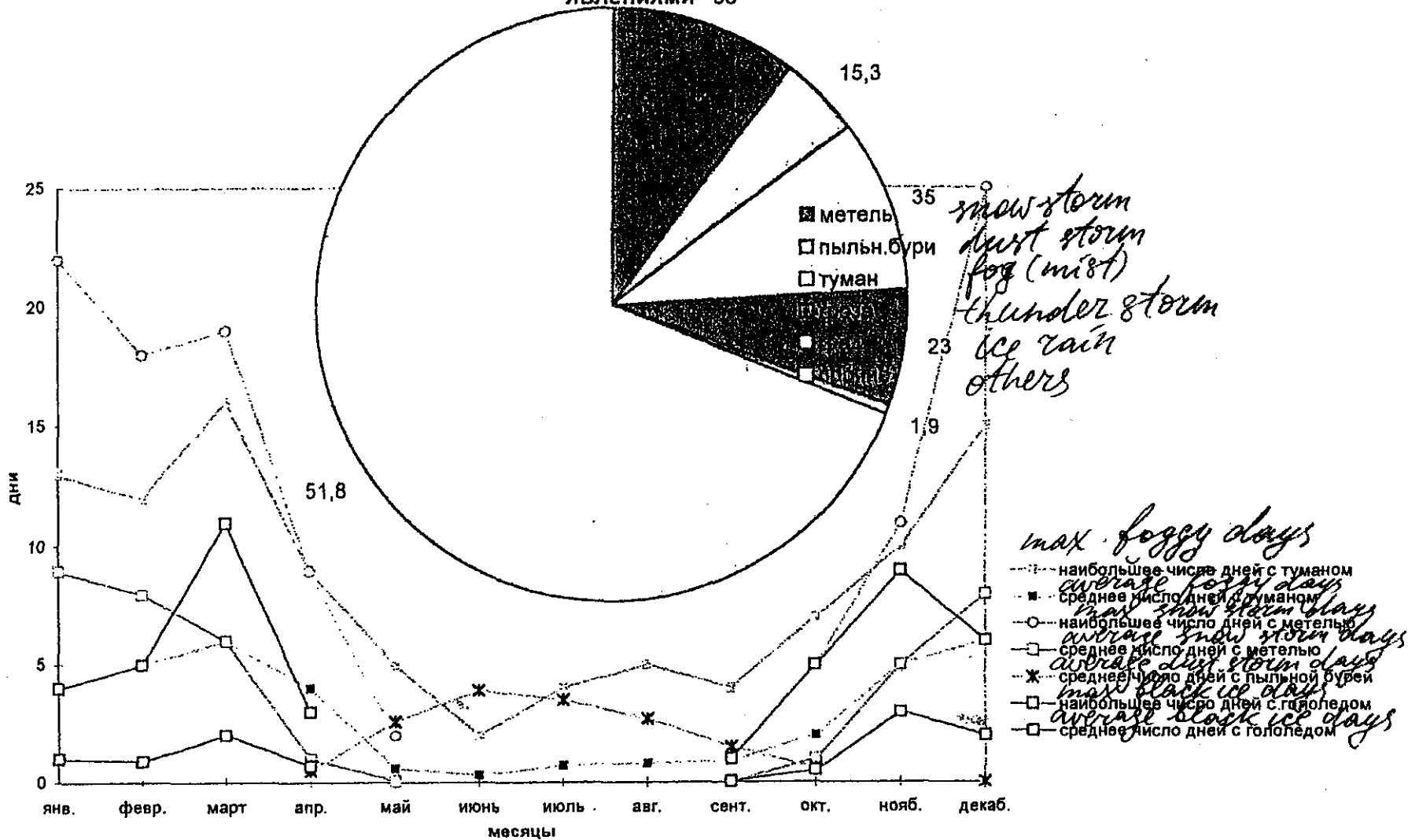
July

Термическая роза ветров, ИЮЛЬ (%) (плюсовая температура воздуха t x на % повторяемости ветров) *air temperature above 10 t x wind repeathness in %*



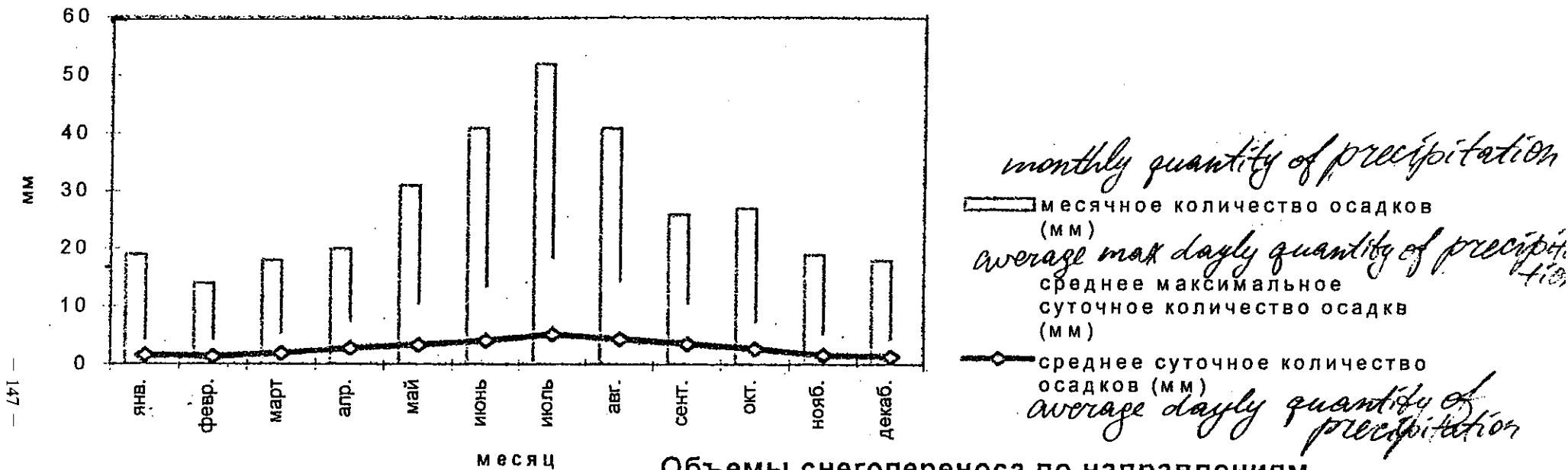
комфортная температура (t°) от + 16,7 до + 20,6 С°
comfortable temperature from +16,7 to +20,6 C°

атмосферные явления
atmosphere events
days in a year with atmosphere events 38
 количество дней в году с атмосферными явлениями 38



Precipitation

Осадки

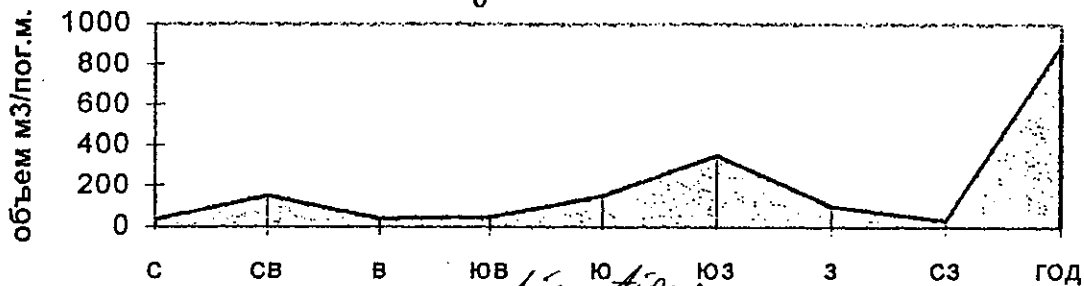


— 147 —

Объемы снеготранспорта по направлениям

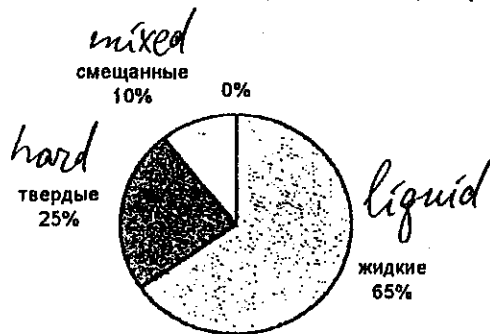
(м³/пог.м.)

Snow movement by directions



Annual quantity of precipitation (types)

Годовое количество осадков по видам (мм)



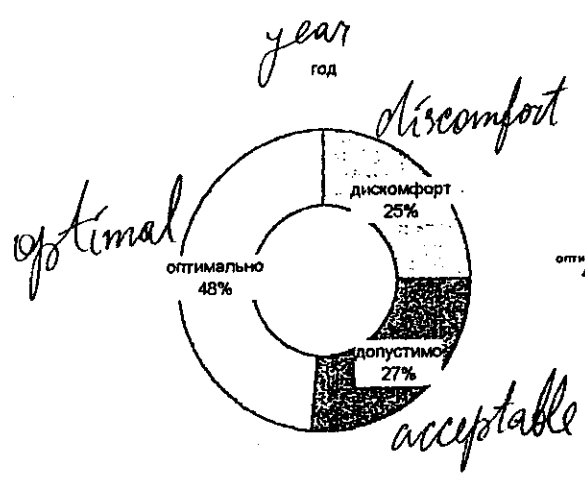
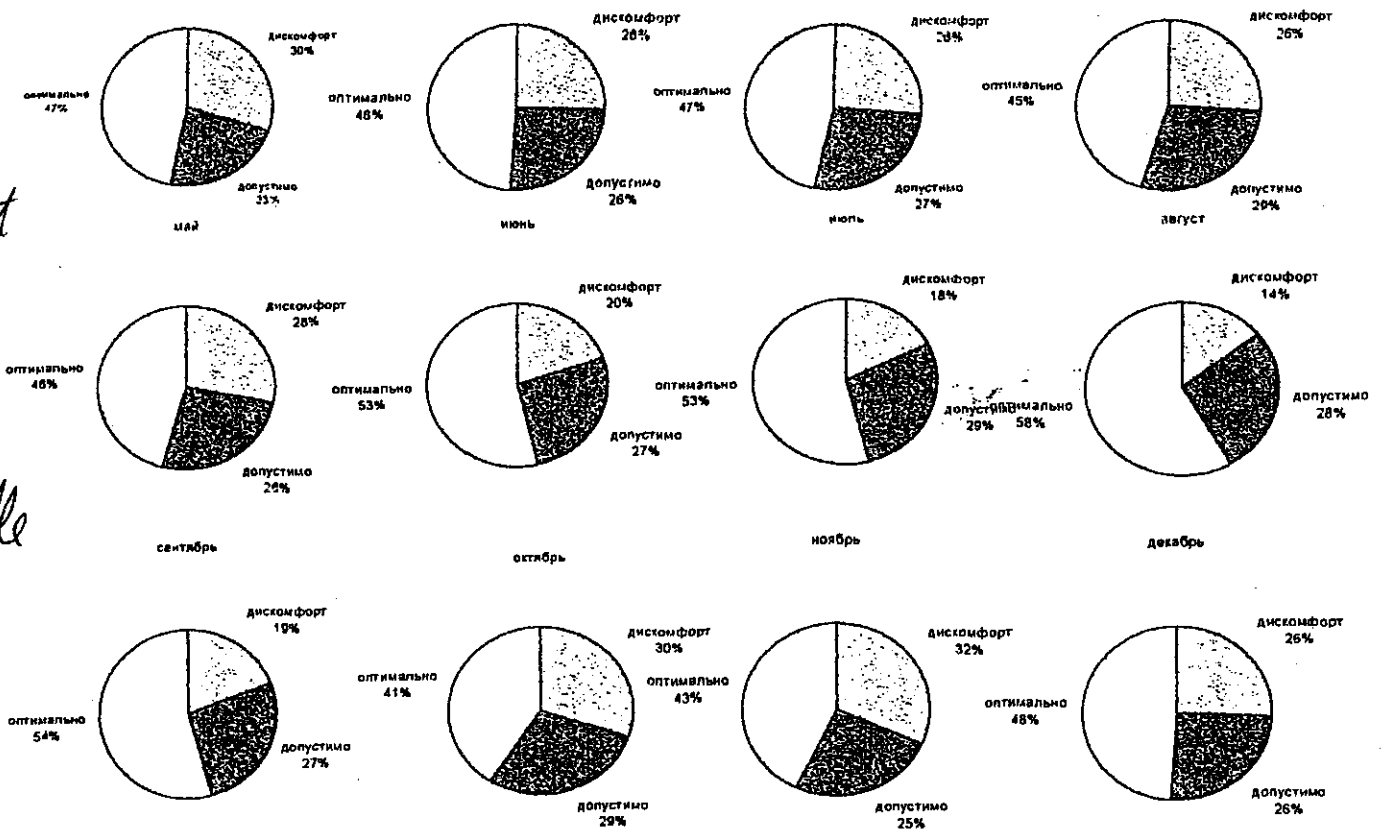
Critical snow movement volume which requires to take measures to regulate and control snow movement

Критическая величина объемов снеготранспорта, обуславливающих необходимость мероприятий по регулированию снеготранспорта являются:
 - общий объем 400 м³/пог.м., с одного направления - 200 м³/пог. м.

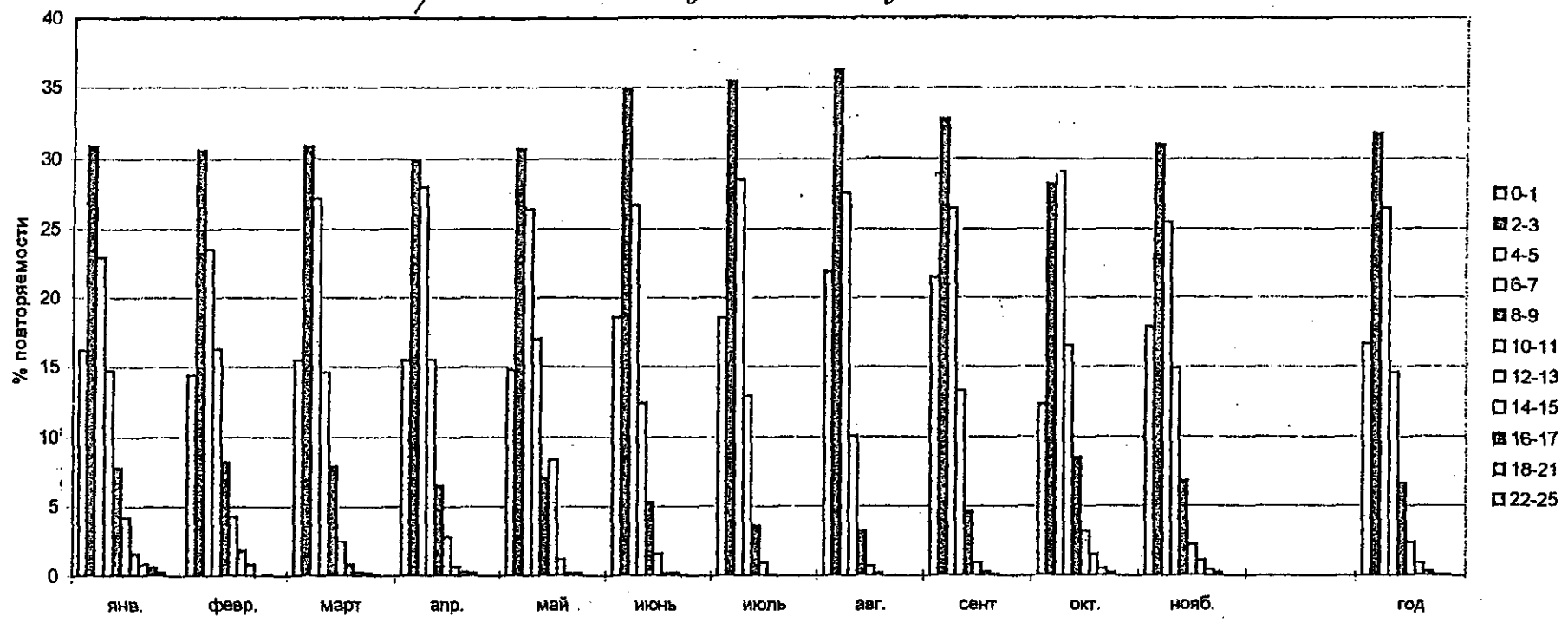
regulate and control snow movement

Ветровой дискомфорт Wind discomfort

January → February → March
январь → февраль → март



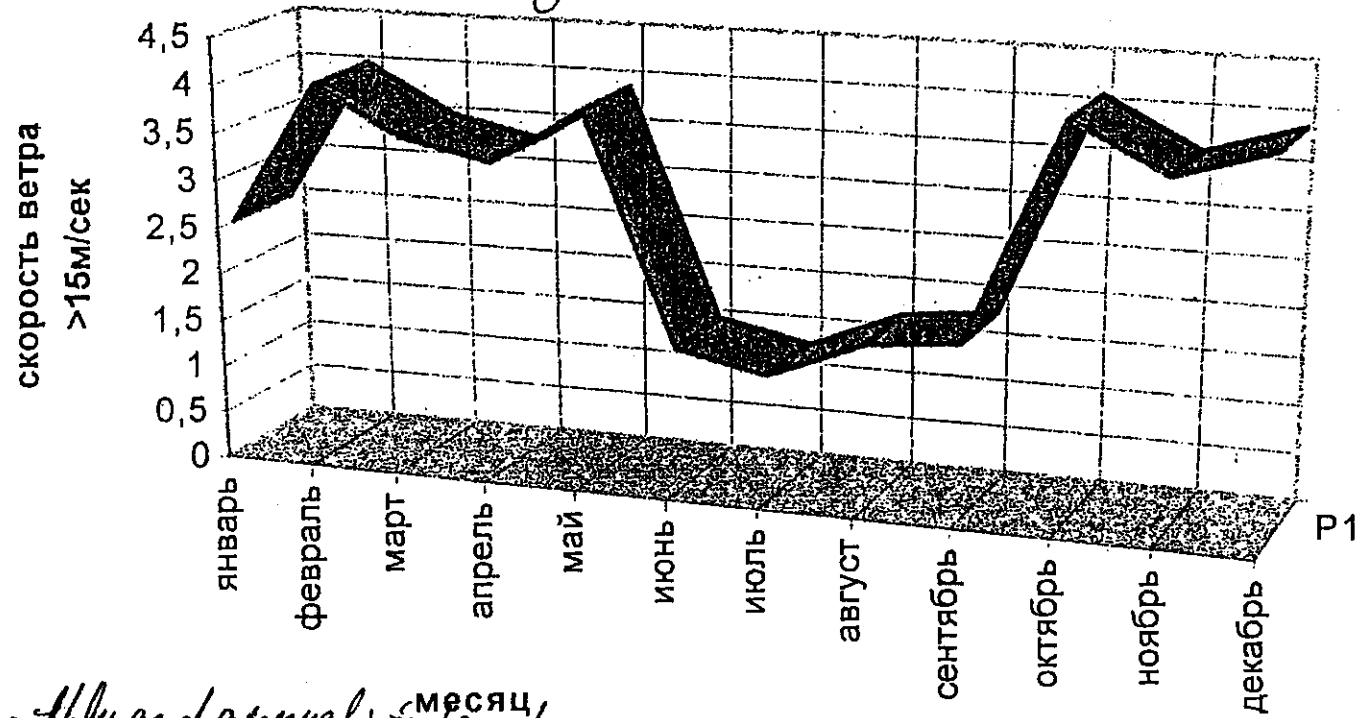
Повторяемость (%) различных градаций скорости ветра
Repeatedness (%) of different gradation of wind speed



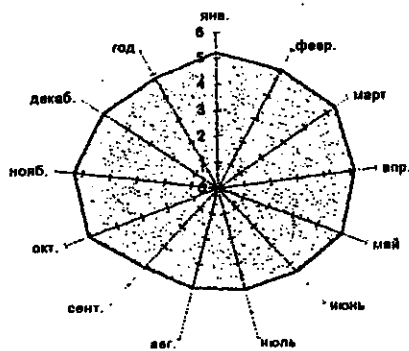
general estimated wind speed
 общая оценка скорости ветра
diffusion of harmful elements on city air

<i>estimated</i> критерий <i>criteria</i> оценки	рассеивание вредных примесей, содержащихся в атмосфере города	0 - 1 м/с	неблагоприятная <i>unfavourable</i>
	<i>thermal human condition</i> тепловое состояние человека	1 - 3 м/с	неблагоприятная (зимний период) <i>bad (winter period)</i>
		3 - 4 м/с	более неблагоприятная (зимний период) <i>worse (winter season)</i>
		5 и > м/с	наиболее неблагоприятная (во все периоды года) <i>worst (during the whole year)</i>

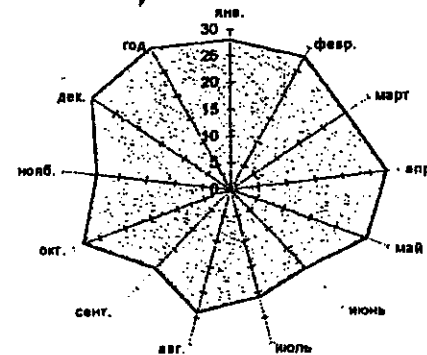
Годовой ход числа дней с сильным ветром >15 м/сек *Annual strong wind chart*



Average monthly and annual wind speed Средняя месячная и годовая скорость ветра (м/сек)

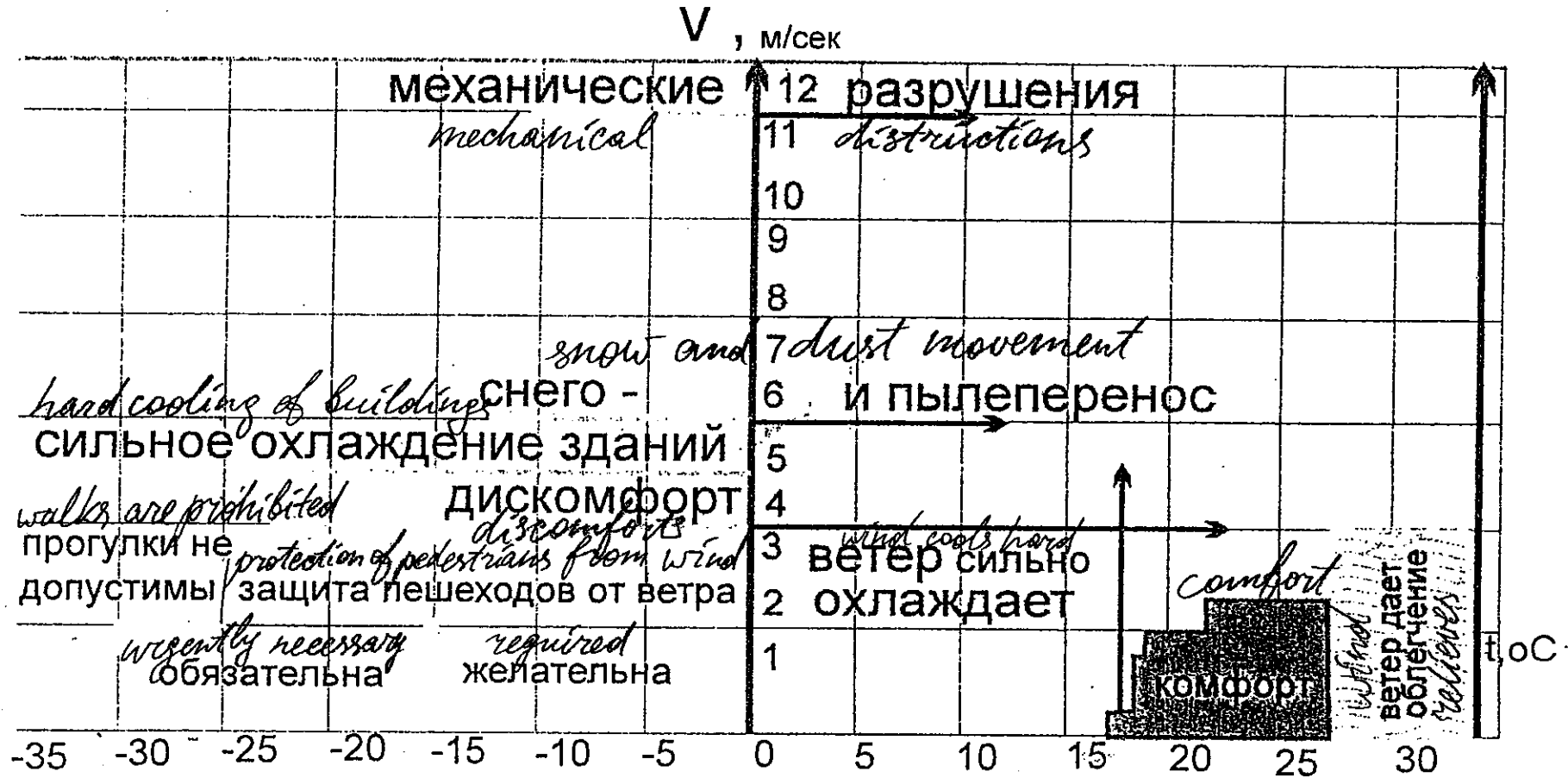


Максимальная скорость ветра и порыв ветра (м/сек) по флюгеру *Max wind speed*



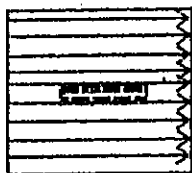
Influence of wind and temperature on housing area

График воздействия ветра (м/сек) и температуры (t °C) воздуха на жилую среду



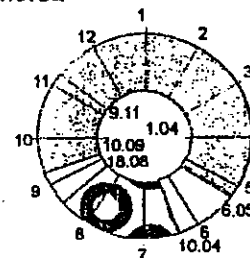
Repeatedness and duration of different types of weather in day time
 Повторяемость и продолжительность различных типов погод
 в дневное время

Open space conditions
 Условия открытого пространства

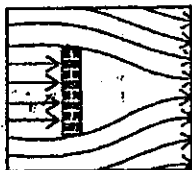


условия открытого пространства

open space conditions

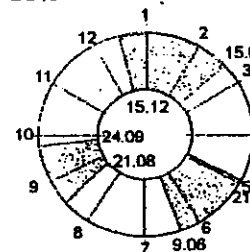
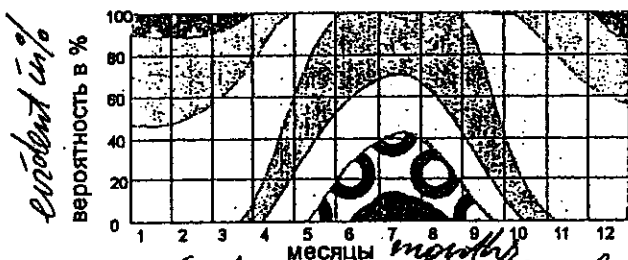


Wind Speed decreasing by 50%
 Снижение скорости ветра на - 50%

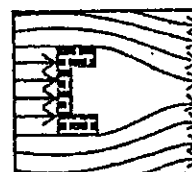


снижение скорости на 50%

speed decreasing by 50%

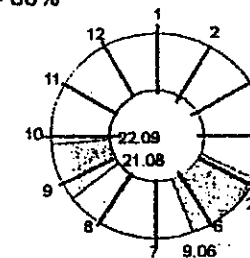
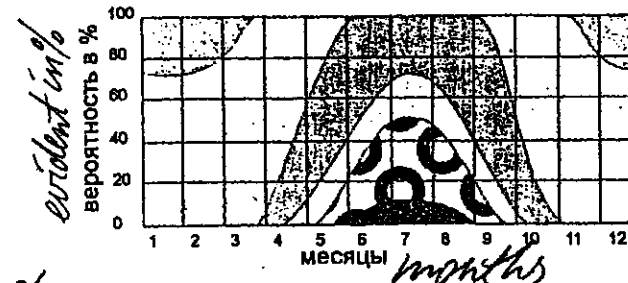


Wind Speed decreasing by 80%
 Снижение скорости ветра на - 80%



снижение скорости ветра до 80%

speed decreasing by 80%

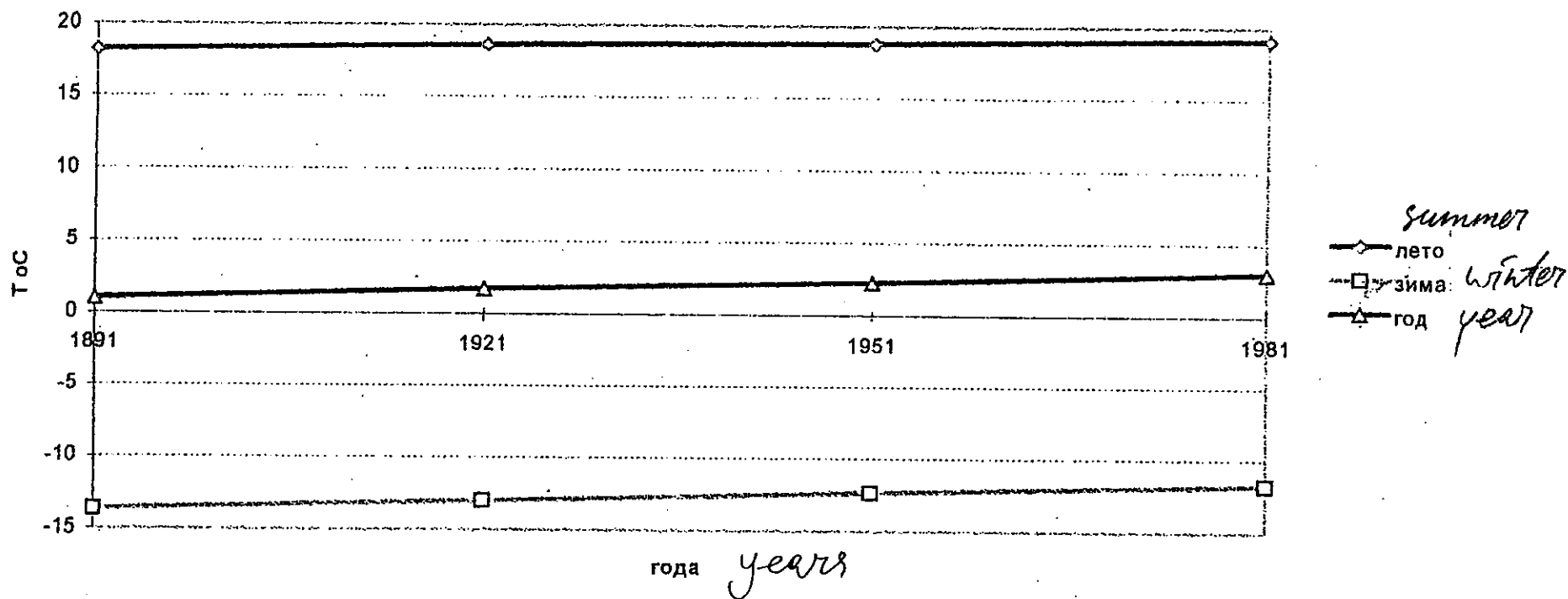


Условные обозначения

суровая холодная погода	холодная погода	прохладная погода	комфортная погода	теплая (умеренно жаркая) погода	жаркая погода	жаркая перегревшаяся погода
-------------------------	-----------------	-------------------	-------------------	---------------------------------	---------------	-----------------------------

cold weather severe cold weather cold weather cool weather comfortable weather warm weather hot weather very hot weather

Интенсивность процесса аридизации в зоне размещения города Акмола за период
1891 - 1981 гг. (90 лет)



По материалам первого международного конгресса "Экологическая методология возрождения человека и планеты земля"
Алматы - 1997 21- 25 апреля.

Аэрация городских территорий

1. Процесс обтекания поверхностей и закономерности движения воздушных потоков на городской территории

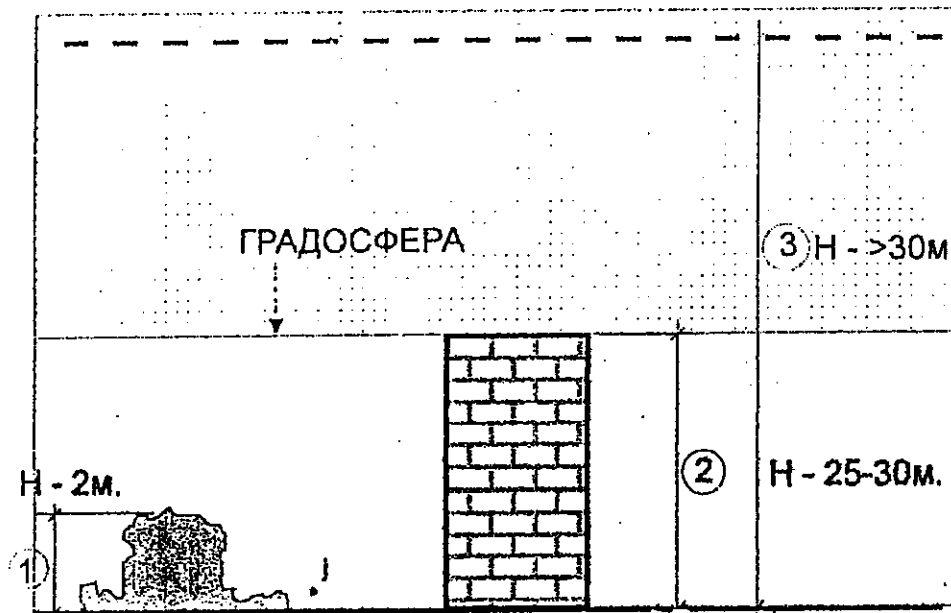


Рис.№1. Трехступенчатая градация шероховатости подстилающей поверхности

- Зона 1 - миктшероховатость (элементы благоустройства, малые архитектурные формы на высоте 2 м.)
- Зона 2 - мезошероховатость (здания и сооружения высота 25 -30 м.)
- Зона 3 - макрошероховатость (крупные элементы рельефа высотой за пределами 30 м.)

(для города Акмола имеет место изменения ветрового режима в пределах градосферы - мезо и микрошероховатость)

Трансформация воздушного потока в пределах градосферы рассчитываются по формуле:

$$V_j = V_0 k; \quad a_j = a_0 + a_1 + a_2;$$

где V_0 и a_0 - скорость и азимут направления ветра на метеостанции за пределом города

V_j и a_j - скорость и направление ветра в точке j (см. рис.1)

k - коэффициент трансформации воздушного потока, определенного по формуле

$k = n_1 n_2$ где - n_1, n_2 - коэффициенты трансформации под действием соответственно мезошероховатости и микрошероховатости
 a_1, a_2 - углы отклонения потока от основного направления

Для представления зависимости ветрового режима от планировочной структуры города и характера застройки (мезошероховатости) территория города, включая пригородную зону, разделяется на четыре переходные зоны, в пределах которых трансформируется воздушный поток.

первая - находится в пригородной части города перед застройкой, средняя высота которой H , ширина $17-18H$, средний коэффициент трансформации n_1 на расстоянии $10H$ от застройки составляет $0,85-0,9$ и снижается до $0,3$ на расстоянии H перед застройкой. Непосредственно у границы застройки скорость несколько возрастает.

вторая - находится за застройкой, в пределах ее ширины $34-36H$, коэффициент трансформации $n_1 = 0,85-0,9$, а за ее пределами снижается до $0,7-0,75$.

третья - находится у границы подветренной стороны застройки, в пределах которой не наблюдается существенных изменений в скорости воздушного потока.

четвертая переходная зона - находится за границей застройки, ширина ее составляет $20-25H$, в пределах которой воздушный поток, трансформируясь до средней величины $n_1 = 0,7$ на выходе, постепенно выравнивается до начальной (полевой) скорости за городом ($n_1 = 1$).

2. Аэрационный режим ветрового потока на территории города.

Территория города, включая пригородную зону, разделяется на четыре переходные зоны, в пределах которых трансформируется воздушный поток.

1 - переходная зона находится в передней части застройки, средняя высота которой H , ширина переходной зоны $17 - 18H$, средний коэффициент трансформации на расстоянии $10H$ от застройки составляет $0,85 - 0,8$ и снижается до $0,3$ на расстоянии H перед застройкой.

2 - переходная зона находится за застройкой, в пределах ее ширины $34 - 36H$, коэффициент трансформации составляет $0,85 - 0,9$, а за ее пределами снижается до $0,7 - 0,75$.

3 - переходная зона находится у границы подветренной стороны застройки, в пределах которой не наблюдается существенных изменений в скорости воздушного потока.

4 - переходная зона находится за границей застройки, ширина ее составляет $20 - 25H$, в пределах которой воздушный поток, трансформируясь до средней величины $0,7$ на выходе, постепенно выравнивается до начальной (полевой) скорости за городом (коэффициент трансформации - 1).

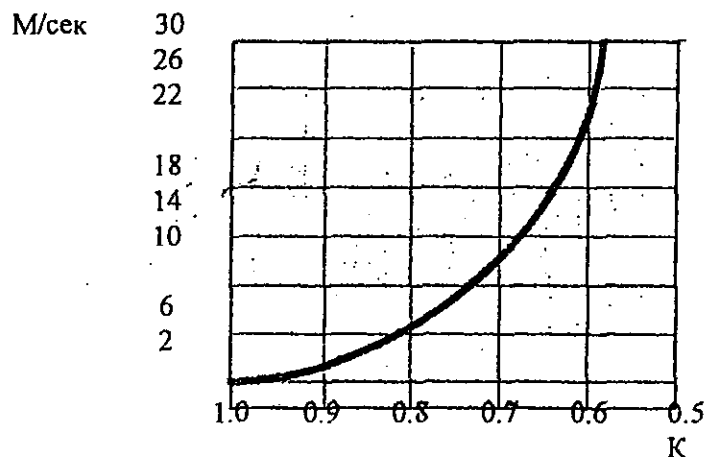


Рис. Снижение скорости ветра на высоте 1.5 - 2 метра от уровня земли относительно скорости ветра на флюгере метеостанции (H_{ϕ}), K - коэффициент перевода

3. Аэрация городской застройки.

Аэрационный режим городской застройки формируется в так называемом "слое обитания человека", т.е. на высоте 2м от уровня земли. Для перехода от скорости ветра, определяемой по данным метеостанции (измеряемым по высоте флюгера) на высоту 2м следует пользоваться графиком, представленном на рис.

Критерием эффективности планировочного решения в аспекте аэрации служит отношение между площадью территории с благоприятным ветровым режимом и всей территории жилого образования. Для средней скорости ветра 7м/сек на высоте 2м от уровня земли, допустимые условия обеспечиваются при снижении скорости ветра на 50%. Критерием оценки в этих условиях является максимум площади жилой территории, улицы и др. над которой исходная скорость ветра снижена на 50% и более.

Basic climate values

основные климатические показатели

estimated characteristics

таблица №

режим солнечной радиации				режим температуры воздуха /градус/				режим ветра				режим влажности				биоклимат				расчетные характеристики										
<i>warmness on horizontal surface</i> суммы тепла на горизонтальную поверхность /ккал/см2/год/		число часов солнечн. сияния (год)		<i>average monthly</i> средняя месячная		<i>average max/min</i> максимум (июль) /минимум (январь)		<i>average daily range</i> средняя суточная амплитуда		<i>average annual wind speed</i> среднегодовая скорость ветра (м/с)		<i>average wind speed</i> средняя скорость ветра м/с		<i>quantity of days during the year</i> число дней за год		средняя месячная относительная влажность воздуха %		длительность различных типов погод в дневное время суток /дни/		температура самой холодн. пятидневки		зимняя вентиляц. температура		отопительный период		глубина промерз. почвы (м)				
<i>direct radiation</i> прямая радиация	<i>diffuse radiation</i> рассеянная радиация	<i>total radiation</i> суммарная радиация	<i>sunshine hours (year)</i> число часов солнечн. сияния (год)	<i>January</i> январь	<i>July</i> июль	<i>average max</i> средний максимум	<i>average min</i> средний минимум	<i>average daily range</i> средняя суточная амплитуда	<i>average annual wind speed</i> среднегодовая скорость ветра (м/с)	<i>January</i> январь	<i>July</i> июль	<i>with wind > 15 m/s</i> с ветром > 15 м/с	<i>with snow storm</i> с метелью	<i>with dust storm</i> с пылью, бурей	<i>average annual precipitation</i> среднегодовое кол-во осадков (мм)	<i>January</i> январь	<i>July</i> июль	<i>July at 10.00 m</i> июль в 13 час.	<i>average number of days with fog</i> среднее число дней с туманом за год	холодная	прохладная	комфортная	теплая	жаркая	перегревная	температура самой холодн. пятидневки	зимняя вентиляц. температура	средняя температура	продолжит. (суток)	глубина промерз. почвы (м)
59,9	51,6	112	2186	-17,4	20,2	27	-22,2	0-14	5,3	5,6	4,5	ср. 40 max 87	ср. 40 max 77	19,8	335	81	58	39	ср. 38 max 67	142	96	58	69	0	0	-35	-22	-8,7	215	190

Количественное выражение зависимости между соотношением длины и ширины фасада отдельного здания и длиной ветровой тени - основа методики планировки в сложных ветровых условиях.

Результаты исследования аэрационных свойств отдельно стоящего здания при направлении под углом 90° к фасаду представлены в виде графика (рис...), откуда следует, что длина ветровой тени зданий изменяются от $1,5H$ (что соответствует отношению длины фасада здания к высоте $l:H = 1:3$) до $12H$ (при соотношении длины фасада к высоте $20:1$).



Рис. Значения коэффициентов трансформации при фронтальном обтекании здания.

Площадь ветровой тени за зданием определяется по формуле:

$$S = 0,8Li,$$

где L - длина ветровой зоны затишья здания (ветровой тени); l - длина здания по фасаду, противостоящему ветру.

Расчет длины (площади) ветровой тени от ветрозащитных древесных насаждений подчиняется тем же закономерностям.

Пространственную структуру древесных насаждений следует рассматривать как подсистему объемно - пространственного регулирования ветрового режима.

Элементы благоустройства, отнесенные к элементам микрошероховатости, влияют на ветровой режим в приземном слое атмосферы на высоте роста взрослого человека до 2м. Коэффициент трансформации воздушного потока составляет для поверхностей: газоны - 1; асфальтированные проезды, тротуары и снежный покров подстилающей поверхности - 1,4; площадки для отдыха и игр, спортплощадки - 1,3; кустарники до 0,5м - 0,7, до 1м - 0,5.

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