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The Project of Placement of Medical and Preventive Institutions Serving The Population and Calculation of Water Consumption

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Abstract. This project is dedicated to the development of architectural, engineering and environmental solutions for the private clinic building. The facility consists of two two-story buildings designed for 15 beds. During the design process, the requirements of the current urban planning regulations, building regulations and regulatory documents are strictly observed.
Calculations of the water supply and wastewater balance of the facility are carried out in detail in the project. The volume of water consumption for household and drinking needs of staff and patients, for the operation of kitchens, washing systems, as well as for irrigation and sanitary cleaning of the territory has been determined. Calculations of wastewater generation were also performed for the main functional areas of the facility.
The facility belongs to the IV ecological category, which characterizes its minimal impact on the environment. During operation, the bulk of the waste is solid waste, while there are no gaseous or liquid emissions. To ensure fire safety, the installation of primary fire extinguishing equipment is provided. In general, the project is characterized by engineering soundness, meets the requirements of environmental safety and is aimed at ensuring comfortable and safe operating conditions for the facility, as well as landscaping the surrounding area.

Keywords: private clinic, architectural design, water supply, wastewater, environmental category, landscaping, engineering networks, sanitary standards, fire safety, building regulations.

Introduction

The purpose of regulating the emissions of pollutants emanating from an organization is to ensure compliance with the criteria for atmospheric air quality, which regulate the maximum permissible concentrations of pollutants for the main components of public health and the ecological system, as well as the conditions under which the maximum permissible (maximum) load on the ecological system is ensured outside the organization's territory or the boundaries of its sanitary protection zone [1]. The study of environmental impact processes and the level of its pollution is one of the most important areas. The development of the "Environmental Impact Statement" project is widely used in the study and assessment of the environmental impact of an object under construction. The development of such documents is important for determining the degree of contamination of the territory and preventing negative consequences.

Despite the significant economic and social progress achieved in recent years, the problems of regional disparities, unequal access to employment opportunities, as well as deficiencies in the management system, including manifestations of corruption, remain urgent. In the period 2020-2023, about 3.5 million people were able to overcome poverty, and in 2024 its national level decreased to 9%. Nevertheless, socio-economic inequality continues to be a significant problem and a priority area of government policy [2]. In rural areas, there are still restrictions on access to quality education, health services and employment opportunities, which indicates an uneven distribution of benefits from economic growth and indicates the need to develop comprehensive measures to ensure inclusive development.

Climate change is exacerbating existing environmental problems, deepening water scarcity, environmental pollution, land degradation and desertification processes. These factors have a negative impact on agriculture, biological diversity, and public health. The Aral Sea, once the fourth largest inland body of water in the world, has now shrunk to about 10% of its original volume, resulting in widespread environmental and socio-economic impacts. At the same time, the accelerated development of industry, population growth, and an increase in the number of cities are putting additional strain on energy and water infrastructure. This exacerbates existing problems and increases the urgency of rational and sustainable use of natural resources [3], [4].

Methodology

Architectural requirements-when implementing the project:

a) the applicable urban planning standards and regulations are observed (SNK 2.07.01-03*);

b) the harmonious combination of the object with the existing building is ensured, with special attention to the formation of a single architectural appearance (ensemble);

c) before starting the development of reconstruction projects for the facility (at the request of the customer or if there are external signs of an emergency condition), it is necessary to obtain an opinion on the condition of the facility (structural strength) from design and other organizations licensed accordingly [5];

d) it is necessary to be guided by this architectural and planning assignment, as well as the design assignment approved by the customer, agreed (for particularly important facilities) with the Main Directorate of Construction of the region, and the approved boundaries on the topographic map on a scale of 1:500; e) when designing the general plan of the facility on a scale of 1:500, the design organization should provide the display of the reconstructed and redesigned building, as well as landscaping and landscaping of the surrounding area, the organization of access and exit paths and Parking spaces for cars [6]. The Ozoda med Emergency Clinic consists of two two-story buildings designed for 15 beds.

Analysis of technological solutions of the project.

In accordance with the design assignment issued by the customer, it may be envisaged to complete the construction in one stage with the subsequent commissioning of the facility. Landscaping and landscaping of the territory: The landscaping and landscaping section of the project provides for:

a) planting of coniferous, ornamental and other trees, shrubs, as well as flower plantations on the territory of the facility [7];

b) covering the green areas with lawn grasses;

c) the application of landscape architecture solutions, taking into account the formation of various tree crown shapes.

During project development:

the requirements of the current regulatory documents have been met:

— SNK 2.07.01-03 "Urban planning norms and rules";

— SNK 2.08.02-09 "Public buildings and structures";

— KMC 1.03.03-20 "Procedure for the development, coordination and
approval of project documentation for major repairs of enterprises, buildings and structures";

— the execution of the Decree of the President of the Republic of Uzbekistan No. 4422 dated 08/22/2019 has been ensured [8], [9];
— the requirements of CMC 2.04.16-18 "Norms and rules of solar hot water supply" have been met;
b) strict compliance with the approved master plan and the detailed layout of the relevant territory is ensured; special attention is paid to the harmonious combination of the object with the surrounding buildings and the formation of a single architectural appearance (ensemble);
c) the requirements of this architectural and planning assignment have been fulfilled, as well as the design assignment developed and approved by the customer and agreed (for particularly important facilities) with the regional Department of Construction and Housing and Communal Services; the boundaries on the topographic map on a scale of 1:1000 have been observed [10], [11];
d) the design took into account the requirements of SNK 2.07.01-03* for the planning and development of urban and rural settlements, including for areas of individual housing construction with private plots: the construction of any buildings is coordinated with the owners of neighboring plots; visual isolation of residential and outbuildings from neighboring plots is provided [12].; it is planned to bring engineering networks to the site; the safety of pedestrian, transport and engineering communications, as well as green areas of common use is ensured.; the standards of insolation of neighboring residential buildings are observed (Figure 1).

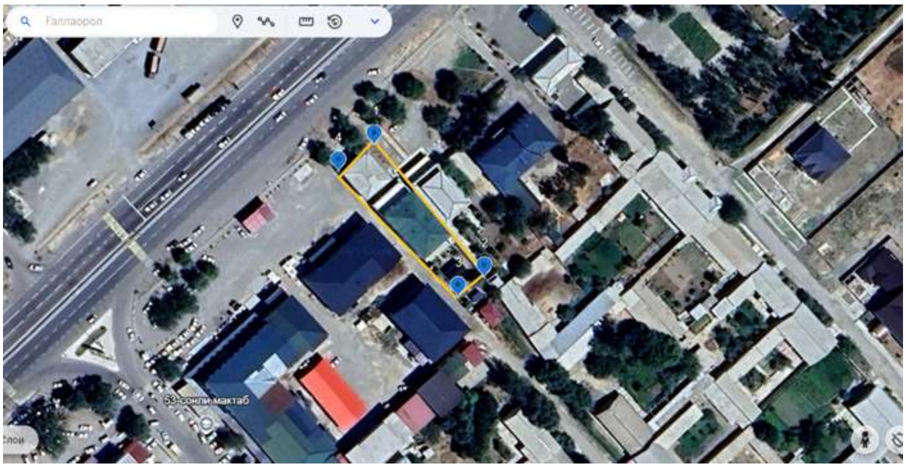

Figure 1. The general general plan of the enterprise

Results and Discussion

The design takes into account the requirements of SNK 2.07.02-22; e) the height and number of floors of the building are taken into account the proportionality of the surrounding buildings and are determined by the urban planning council [13].

The facility's need for water According to the technical conclusion of "Zhizzakh suv taminoti" LLC (Gallyaralsky district branch), water supply is provided in compliance with applicable regulations.

In the projected facility, water is used for the following purposes:

Household and drinking needs Drinking water consumption for employees: The calculation is based on the formula:

QDay = N × n / 1000

where: n is the rate of drinking water consumption per employee, n = 12 liters/person;

N is the number of employees, N = 11 people;

T is the number of days in a year, T = 290 days.

QDay = 11 × 12 / 1000 = 0.132 m3/day

QYear = Q Day × T = 0.132 × 290 = 38.28 m3/year

Drinking water consumption for the clinic's patients:

The calculation is based on the formula:

QDay = N × n / 1000 where:

N is the number of beds in the clinic, N = 15;

n is the water consumption rate, n = 25 liters/person;

T is the number of days in a year, T = 290 days.
QDay = 15 × 25 / 1000 = 0.375 m3/day
QYear = Q Day × T = 0.375 × 290 = 108.75 m3/year
Water consumption in the kitchen The calculation is performed using the formula:
Q Day = N × r / 1000
where: N is the water consumption rate for cooking one serving, N = 10 liters/dish;
r is the number of places in the kitchen, r = 15;
T is the number of working days per year, T = 290 days.
Q Day = 10 × 15 / 1000 = 0.15 m3/day
QYear = QDay × T = 0.15 × 290 = 43.5 m3/year
The water consumption for washing baths (washing dishes) is calculated using the formula:
QDay = N × r × t / 1000 where:
N is the rate of water consumption;
r is the number of washes or operations;
t is the duration of use. (The values of the parameters are specified in the project depending on the technological equipment.)
Water consumption for washing baths (washing dishes):
The calculation is performed using the formula:
QDay = N × r × t / 1000
where: N is the rate of water consumption per washing tub, N = 200 liters / hour;
r is the number of baths, r = 1 pc.;
t is the operating time of the bath per day, t = 2 hours;
T is the number of working days per year, T = 290 days.
Qsut = 200 × 1 × 2 / 1000 = 0,4 m3/day
QYear = Q Day × T = 0.4 × 290 = 116 m3/year
Watering of hard surfaces of the territory: The calculation is performed using the formula [14]:
QDay = N × S × K / 1000
where: N is the rate of water consumption per irrigation, N = 0.5 l/m2;
S is the area of the irrigated area, S = 170 m2;
K is the frequency of watering per day, K = 1;
T is the number of watering days per year, T = 200 days.
Qsut = 0,5 × 170 × 1 / 1000 = 0,085 m3/day
QY = 0.085 × 200 = 17.0 m3/year
Watering of green areas:
The calculation is performed using the formula:
QDay = N × S × K / 1000
where: N is the rate of water consumption per irrigation, N = 6 liters/m2;
S is the area of the landscaped area, S = 40 m2;
K is the frequency of watering per day, K = 1;
T is the number of watering days per year, T = 180 days.
Qsut = 6 × 40 × 1 / 1000 = 0,24 m3/day
QY = 0.24 × 180 = 43.2 m3/year
Water consumption for fire fighting:
The water supply for fire extinguishing on the territory of the facility is 8 m3.
Calculation of wastewater.
Household drinking wastewater (from staff):
Wastewater from household drinking activities accounts for 30% of the water consumption for the drinking needs of employees.
In this case, the volume of wastewater is: 0.0396 m3/day, 11.48 m3/year Wastewater from patients (medical activity):
Wastewater from patients accounts for 30% of the water consumed.
In this case, the volume of wastewater is: 0.1125 m3/day, 32.62 m3/year. Waste water from

kitchen operation [15]:

In the kitchen, wastewater accounts for:

— 40% of the water consumption for cooking;

— 100% of the water consumption for washing baths. In this case, the total volume of wastewater is: 0.46 m3/day, 133.4 m3/year.

Conclusion

Environmental impact of the facility. The facility belongs to the IV ecological category according to the degree of environmental impact. In order to prevent emergencies, the facility provides for the installation of primary fire extinguishing equipment designed to eliminate fires at the initial stage.

The total amount of emissions during operation is 0.486 tons/year, including: — solid waste — 0.486 tons/year (100.0%); — there are no gaseous or liquid emissions.

The total water consumption for the facility is 369.93 m3/year, of which: — 306.53 m3/year of water for household and drinking needs, which comes from the local water supply network; — for irrigation of the territory — 17.0 m3/year, for irrigation of green spaces— 43.2 m3/year. Water for irrigation of the territory and landscaping is used from a local irrigation ditch water source.

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