ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ОЛИЙ ВА ЎРТА МАХСУС ТАЪЛИМ ВАЗИРЛИГИ

ТОШКЕНТ АРХИТЕКТУРА – ҚУРИЛИШ ИНСТИТУТИ

ҚУРИЛИШНИ БОШҚАРИШ ФАКУЛЬТЕТИ

"Шаҳар қурилиши ва хўжалиги" кафедраси

QURILISHNI BOSHQARISH FAKULTETI
RUXSAT ETILDI
«29» июнь 2018 yil

Ҳимояга
РУХСАТ ЭТИЛСИН
Кафедра мудири
Хотамов А.Т.
«23» 06 2018 й.
№23/2 баённомаси

5340300 «ШҚХ» йўналиши бўйича бакалавр даражасини олиш учун бажарилган диплом лойихасининг (ишининг)

ТУШУНТИРИШ ХАТИ

Лойиҳа (иш)

мавзуси: « Project suggestion of 6-storied apartment Building in street Makhtum-Kuli Yashnabad, Tashkent city »

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Тушунтириш хати - 76 бет.
Чизма 4 варақ

Тошкент – 2018 й.

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ҚУРИЛИШ ВАЗИРЛИГИ

ТОШКЕНТ АРХИТЕКТУРА ҚУРИЛИШ ИНСТИТУТИ

Қурилишни бошқариш факультети **ШҚХ кафедраси**

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ТАСДИҚЛАЙМАН
Кафедра мудири
2017 йил
пр № 5. 03.10.2017.

ТОПШИРИҚ

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Институтнинг «16.12.» 2017 йилдан № 5/41- сонли буйруғи билан тасдиқланган.

2. Ишга оид дастлабки маълумотлар: Бинонинг режаси, бинонинг қирқими, топографик харита, гидрогеологик маълумотлар, ситуацион режа

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2 лист – Бинонинг 14-1 фасади, намунавий режа, том режаа.
3 лист – Бинонинг пойдевор ва ораёмпа режаси, тугунлар схемаа.
4 лист – Тармоқ графиги, шачилар ҳаракати графиги, экспликация.

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3. Конструктив ҳисоблаш қисми	Хотамов А.Т	19.03.18 - 17.04.18	
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2.	Архитектура-қурилиш қисми	28.03.18й	
3.	Конструктив ҳисоблаш қисми	17.04.18й	
4.	Ташкилий-технологик қисми	08.05.18	
5.	Меҳнат муҳофазаси қисми	05.05.18	

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Introduction

While analyzing urban development and planning in Uzbekistan, two elements should be taken into account: its history, and its varied landscape and climate. These elements account for the contemporary geography, morphology and societal composition of Uzbekistan's cities. The country has a very diverse landscape and a rich and ancient culture: the Great Silk Road crossed Uzbekistan, and its cities were important international centers of commerce and cultural exchange, with mutual enrichment of culture and language. Some of the major cities in Uzbekistan are more than 2,500 years old, including Tashkent, Samarkand, Bukhara, Shahrisabz, Khiva and Termez. Historical and natural conditions in different regions of the country have led to the development of different kinds of settlements. These can be described as follows:

• Old developed areas, with intensive urban development and high-density settlements, widely ranging in size (for example, Tashkent, Samarkand, Bukhara region, the Ferghana Valley), but with a relatively uniform distribution

• Ancient irrigation areas such as Khorezm and Karakalpakstan, with a network of small rural settlements concentrated in favourable climatic zones and serving as communication nodes

• Newly irrigated land of the central part of the Ferghana Valley, Karshi, Jizzakh and Mirzachul steppe, with sporadic rural and urban settlements • Mountain areas with small rural settlements in river valleys

• Desert areas with small rural settlements and pastures As of 1st January 2017, Uzbekistan had 120 cities. Most towns are in regions with more favorable environmental conditions. Having been a part of the former Soviet Union, the Republic of Uzbekistan inherited a complex hierarchical planning system, and urban planning remains highly centralized. Goskomarkhitektstroy manages the development of major cities by planning and approving administrative and residential buildings, engineering infrastructure and communications. This is done

in accordance with the Town Planning Code, which is also used by khokimiyats of cities and viloyats to standardize planning documentation at various levels. Planning documentation has a pyramidal hierarchy, from the Master Scheme of Settlement, to schemes of territorial planning, down to the master plan of an individual settlement. This addresses long-term development based on economic growth, demography, geography, climate and social requirements. Categories include residential, public and business, manufacturing, engineering, transport, recreation, special-purpose and suburban areas. Where applicable, planning documentation also includes:

• Planning documents for development of the territory and parts of the territory of the Republic of Uzbekistan

• Planning arrangements of the districts of the Republic of Karakalpakstan and viloyats

• Planning arrangement projects for districts or groups of districts

The Master Scheme of Resettlement and the development plans for parts of Uzbekistan's territory are 50-year plans, with a particular focus on the next 10 to 25 years. Other urban planning documents cover 25 years, with a focus on the first phase of construction. All planning documents are subject to revision 10 years after their adoption. The master plan of an urban settlement takes into account the main provisions of the previous master plan and accomplishes the following tasks:

• Determining prospective economic development and forecasting population growth

• Defining the main development direction of a settlement

• Developing proposals on the settlement's functional zoning and architectural design

• Identifying reserved land for further development

• Providing the principles for equipment systems and land development Urban development in Uzbekistan is based on the concept of compact cities, with the territory divided into planning districts and central or peripheral planning areas. Bigger cities are conceived as polycentric systems. According to Article 41 of the Town Planning Code, master plans must ensure:

• A favorable living environment

• Protection of areas from the effects of natural and manmade disasters

• Prevention of excessive concentrations of population, industry or pollution

• Protection and use of specially protected territories and objects of cultural heritage

Urban development of the city of Tashkent

Tashkent is the capital of Uzbekistan, with a population of more than 2.4 million people. This makes it, not just the largest city in the country, but the largest in Central Asia. Currently, the city of Tashkent has a relatively compact shape: 25 kilometres north-south, and about 22.5 kilometres east-west. On 1 January 2017, the territory of Tashkent was 33,378 hectares, 57 divided into 11 administrative regions.

Tashkent is distinctive for its broad streets, with wide green separation zones – sweeping lawns separated from the road with walkways. There are 911,100 kilometers of these green strips, in streets, roads and driveways. The total area of green corridors and plantations within city limits is 9,579.2 thousand hectares, or 28.6 per cent of the total area. In addition, there are about 5.5 m^2 of parks and gardens per inhabitant in Tashkent, which, with the street greenery and the greenery of the individual housing, adds up to 50 m^2 per inhabitant. By proportion of industrial area, Tashkent is definitely a post-industrial city; the city administration intends to reduce this further, redeveloping former industrial "brownfields." Office land share stands at only 2 per cent, although this figure may

be a result of categorization (i.e., small businesses may be located within residential buildings). Motor road area appears significant, at 21 per cent, but is similar to the proportion found in other international cities. On January 1, 2017, the housing stock in Tashkent stood at 45.7 million m2 . This has resulted in an average housing supply is 19.5 m^2 per inhabitant.

The Tashkent Master Plan incorporates this as a policy, and some positive trends can be seen: For example, buildings are being built higher, meaning that the density of housing floors (m^2 /hectare) has increased by 32 per cent. However, the picture for Tashkent is mixed – while high-rise floor area (4-/16-storey houses) has increased by 45 per cent, low- rise floor area (1-/2-storey houses, predominantly individual homes) has increased by almost twice as much, at 84 per cent. Overall, these figures are a positive development for housing provisioning policy, but they are evidence of urban sprawl also and undermine the "compact city" policy, if the trend continues.

Tashkent housing stock is varied in terms of types of buildings, floors, structural systems and degree of comfort. Residential buildings can be grouped as low-rise, with 1, 2, and 3 floors, or high-rise. The 61 latter category subdivides into 4- or 5-storey buildings with no elevators, and 6 to 16-storey buildings with elevators. However, apartment buildings with elevators account for only 16.55 per cent of multifamily housing stock area and 10.86 per cent of total housing stock area. In all, housing stock has been shaped by policy swings. Initially high-rise housing was favored, motivated by the need to save land, but this changed to providing urban land for low-rise individual buildings. Low-rise housing is much desired but leads to urban expansion, absorbing valuable agricultural land; in addition, it is more expensive to develop and supply with infrastructure. In spite of this, in coming years the volume of low-rise individual dwellings is expected to increase significantly. This will be due to the inclusion in previous city plans of large areas for rural-type buildings, as well as implementation of previous decisions on allocation of land plots for individual housing development. Tashkent's population is projected to grow by 442.6 thousand people between 2012 and 2030, according

to the State Institute of Forecasting and Macroeconomic Research, 58 People of working age currently comprise 61.3 per cent of the total, although this is expected to drop to 58 per cent in the future.

Much recently our President of Uzbekistan Shavkat Mirziyoyev signed a decree "On action strategy on further developing of Uzbekistan" on 7 February, 2017.

The action strategy on five priority directions on development of Uzbekistan is designed for 2017-2021. The document was widely discussed before it was adopted.

The document is aimed at improving the efficiency of the reforms, creating conditions for full and accelerated development of the state and society, implementing the priority areas for modernization and liberalization of the country in all spheres of the life.

The strategy includes five priority directions – improving state and public construction, ensuring rule of law and reforming judicial-legal system, developing and liberalizing economy, developing social sphere and ensuring security, inter-ethnic harmony and religious tolerance, implementing balanced, mutually beneficial and constructive foreign policy.

The Uzbek leader with his decree created the National Commission on the implementation of the Action Strategy for the five priority areas of Uzbekistan for 2017-2021. President Shavkat Mirziyoyev will personally head the commission.

The strategy will be implemented in five phases, each of which envisages approval of a separate annual State programmes for its implementation.

In the fourth priority direction of this strategy is development of the social sphere which includes following;

Implementation of targeted programs to build affordable housing, development and modernization of road transport, engineering, communications and social infrastructure, ensuring the improvement of living conditions of the population:

- further improvement of living conditions of the population, especially of young families, residents of dilapidated houses and other citizens in need of better housing by providing mortgage loans on preferential terms and construction of affordable housing in urban and rural areas;
- improving of utility services, provision of clean drinking water in rural areas through construction of new water pipelines, steady introduction of modern cost-effective and efficient technologies;
- ensuring environmental safety, construction and modernization of recycling of household waste, strengthening their logistical base, providing households with modern waste management facilities;
- achieving major improvement of transport services, raising passenger safety and reduction of harmful emissions into the atmosphere, purchasing of new comfortable buses, construction and reconstruction of bus stations;
- further construction and reconstruction of road infrastructure, particularly, development of regional roads, overhaul and repair of off-farm rural roads, streets in settlements;

As practical action of this legal document we have witnessed huge changes in different regions of Uzbekistan. For instance, Shavkat Mirziyoyev examined new houses in Sergeli district in Tashkent city.

The Head of our state Shavkat Mirziyoyev during the meeting with voters of the city of Tashkent paid special attention to housing problem in our capital, in particular, it was noted that new program has been adopted. According to which 20 buildings will be built in each district of the capital in 5 years, and 9-storey houses, new residential areas will be provided with all necessary social infrastructure, connected to engineering networks, the adjacent territory will be landscaped.

The work on implementation of the planned program was organized in the shortest time and at high rates. A similar housing estate has already been created in Sergeli district of the capital. Construction of new multi-storey residential buildings, started at the beginning of this year in accordance with the resolution of the Head of our state “On measures of implementing the Program on construction and reconstruction of affordable apartment buildings in cities for 2017-2020” of November 22, 2016, is fully completed today.

The Head of our state, for the last period, got acquainted with the progress of construction activities several times, gave necessary instructions.

“We are building these houses not to show off, but with a thought on the interests of the population”, -said the President of our country. Therefore, the building should be built in accordance with modern requirements. In addition, it is also our duty to operate the houses properly. In this regard, it is necessary to increase the responsibility of residents, to strengthen their sense of responsibility for their home. Moreover, our president Shavkat Mirziyoyev visited Sulton Jura Makhalla in Adijan region, as well as Nukus city, Bukhara regions to inspect newly built apartments.

At present, construction of 30 five-storey residential buildings is being completed here. Modern conditions are being created in these houses, apartments, which will be provided on the basis of preferential mortgage loans. The houses will be commissioned in 2019. Next year another 20 houses will be built along this street.

A modern makhalla guzar, consumer services points, a beauty salon, a mini-bank, children's playgrounds will appear in the array. The adjacent territory will be landscaped. The President emphasized, “All new houses should be equipped with cutting-edge technology of solar panels in order to supply building with alternative energy sources. We all must learn this and implement them in our new buildings”

Taking into account the growing interest of the population in affordable housing, the Head of our state gave instruction on construction here of another 15 multi-storey houses next year. Considering above mentioned facts, graduator aimed to design new apartment complex in Yashnabad district due to new modernisation and rebuilding process has been occuring since our president signed new degree. As a graduator I hoped to make some of my little contribution this process.

CHAPTER I.
URBANISATION PART

1.1. The role of the region in urban planning.

The total area of Tashkent city is 334.48km^2 and consists of 11 administrative districts. Our project is located in Yashnabad district of Tashkent and is located in the south-eastern part of Tashkent city, Yashnabad (Hamza).

Khokimiyat of Yashnabod district (st. Fargona Yuli, 21) - administrative and territorial unit. It was formed in 1968. The length of the area: Prospect Amir Temur and street Istiklol to the street "Fargona Yuli", the road from street Ohangaran to PARKENT. The area - 3.37 hectares, including a plot of land - 615 hectares. Population - 204.9 thousand (2009). Number of streets - 365. The main ones are: Istiklol Tarraqiyot, Fargona Yuli, Tashkent Ring Road, Zharkurgon, Yashnabad and Okhangaron. In the area there are 50 mahallas. The district is operated by 2769 enterprises and organizations, 2169 Small and micro businesses, 266 joint ventures. Including: Tashkent Aircraft Production Association, construction companies "Lift", "Uzenergotamir", "Toshkentvino", "Gall-Alteg", "Uzbek kogozi", "Uzbekistan Champagne", "Toshdonmahsulot", "Toshkentguruch" AK "Farm Glass "and other organizations; railway undertakings - Warm and wagon depot, unloading station. Also in the area there are 78 enterprises of transport and communication. At full power a joint venture "Farm Glass" Uzbekistan-Britain, "Tufin" Uzbekistan-Israel, the joint venture "Lok-Color-Synthesis" Uzbekistan-Switzerland, Joint Venture "Hobas-Tapo" Uzbekistan-Germany-Switzerland, the joint venture "NWA" Uzbekistan- Russia, which produced import-substituting products are operating. The district has the Presidium of the Academy of Sciences of Uzbekistan, 3 research institutes, 28 schools, 41 kindergartens, 2 children's schools, 5 musical schools, 3 special schools - boarding schools, 5 vocational colleges, 2 lyceums, business school. Provides services 9 hospitals, 30 health centers and dispensaries, 1 station for blood transfusion. Provide the population with its services 58 retail facilities and catering enterprises, 176 trade enterprises, 3 markets , 361 objects of consumer services. In the area there are 10 public libraries, 2 cinemas, 3 palaces of culture, recreation area, 1 stadium, 46 gyms, 2 swimming pools, 116 sport grounds. In the area there is building of the Tashkent Medical Academy (before Cadet Corps) built in the 19th century, the Roman Catholic Church (Church of Poland, 1914-1917.) - own national importance. In the area there are embassies of France, Turkey. China, Indonesia, Ukraine, Japan and the Korean national center.

Construction of a new upper ground metropolitan area of Tashkent has been begun on the road to the eastern border of the district, which limits the eastern border of the district. This, of course, is an important factor in connecting the city with the provincial districts, the crucial role in the development of transport infrastructure in the region and, in turn, the solution to the problem of urban transit.

Yashnabad district, in turn, borders with the Kibray district of Tashkent region in the south-east.

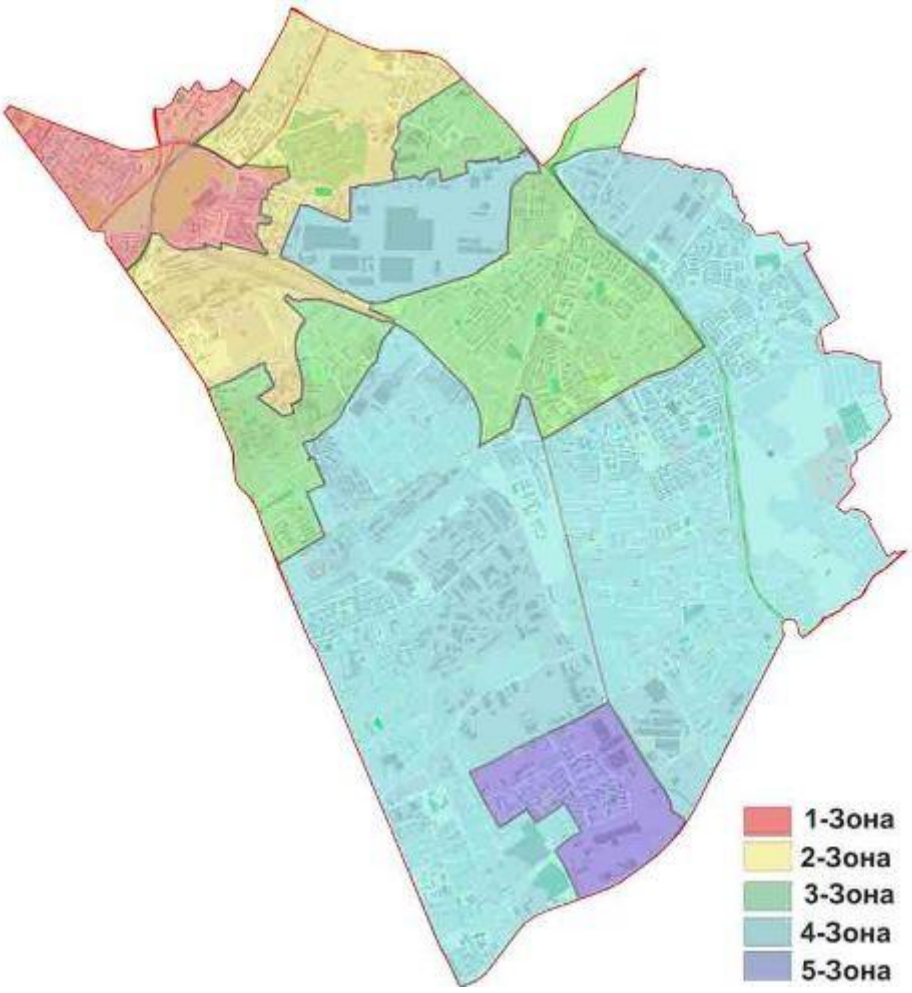

Figure 1.1. Situational plan of the object

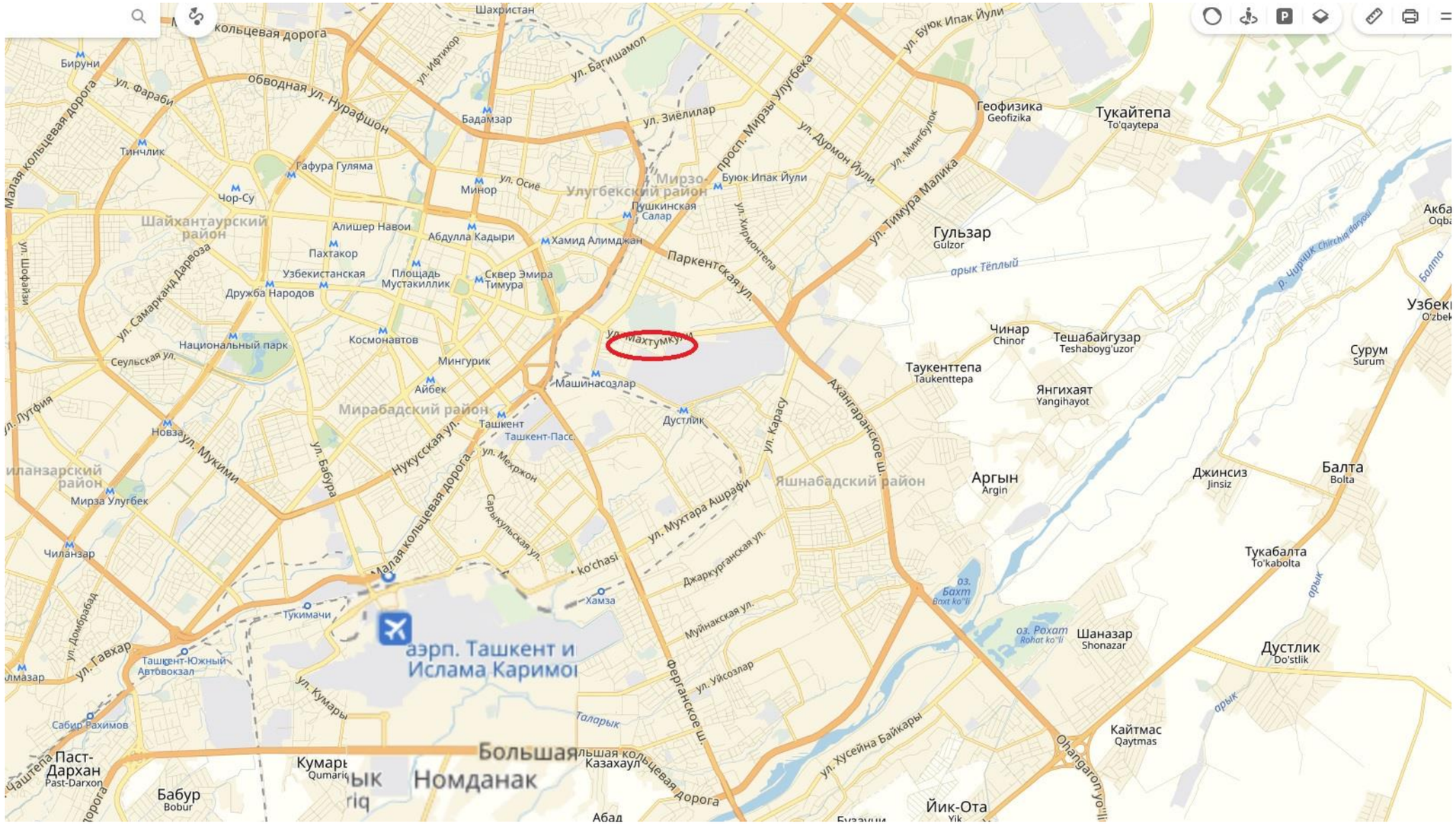

Figure1.2 Satellite view of object location

1.2. Object's border territory.

The object is located on the side of a new road street Makhtumkuli with the permission of the Tashkent city administration. The construction site surrounded with 4-5-storey apartments, and the distance between residential and construction sites is relevant with the current regulations and boardered with local roads and landscaped area by three sides.

The south side is a 4-storied residential complex, facing to the sun, and intermediate distances available between other buildings regarding to current standards of Building Code. Particular attention is given to the regime of ventilation in the area, and there are open-air environments in the south-west, north-west, north-east and south-east.

1.3. Environmental assesment

Climate.

Tashkent features a Mediterranean climate with strong continental climate influences. As a result, Tashkent experiences cold and often snowy winters not typically associated with most Mediterranean climates and long, hot and dry summers. Winters are cold and often snowy, covering the months of December, January and February. Most precipitation occurs during these months which frequently falls as snow. The city experiences two peaks of precipitation in the early winter and spring. The slightly unusual precipitation pattern is partially due to its 500 m (roughly 1600 feet) altitude. Summers are long in Tashkent, usually lasting from May to September. Tashkent can be extremely hot during the months of July and August. The city also sees very little precipitation during the summer, particularly from June through September

- Annual moderate warm — +14,8 C°
- Annual moderate speed of wind — 1,4 м/с

Some climatic indexes are shown as follows:

Climate data for Tashkent (1981–2010) [hide]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	22.2 (72)	25.7 (78.3)	32.5 (90.5)	36.4 (97.5)	39.9 (103.8)	43.0 (109.4)	44.6 (112.3)	43.1 (109.6)	39.8 (103.6)	37.5 (99.5)	31.1 (88)	27.3 (81.1)	44.6 (112.3)
Average high °C (°F)	6.9 (44.4)	9.4 (48.9)	15.2 (59.4)	22.0 (71.6)	27.5 (81.5)	33.4 (92.1)	35.6 (96.1)	34.7 (94.5)	29.3 (84.7)	21.8 (71.2)	14.9 (58.8)	8.8 (47.8)	21.6 (70.9)
Daily mean °C (°F)	1.9 (35.4)	3.9 (39)	9.4 (48.9)	15.5 (59.9)	20.5 (68.9)	25.8 (78.4)	27.8 (82)	26.2 (79.2)	20.6 (69.1)	13.9 (57)	8.5 (47.3)	3.5 (38.3)	14.8 (58.6)
Average low °C (°F)	−1.5 (29.3)	0.0 (32)	4.8 (40.6)	9.8 (49.6)	13.7 (56.7)	18.1 (64.6)	19.7 (67.5)	18.1 (64.6)	13.0 (55.4)	7.8 (46)	4.1 (39.4)	0.0 (32)	9 (48.1)
Record low °C (°F)	−28 (−18)	−25.6 (−14.1)	−16.9 (1.6)	−6.3 (20.7)	−1.7 (28.9)	3.8 (38.8)	8.2 (46.8)	3.4 (38.1)	0.1 (32.2)	−11.2 (11.8)	−22.1 (−7.8)	−29.5 (−21.1)	−29.5 (−21.1)
Average precipitation mm (inches)	57.8 (2.276)	57.2 (2.252)	64.8 (2.551)	59.8 (2.354)	40.9 (1.61)	10.8 (0.425)	3.5 (0.138)	1.9 (0.075)	5.9 (0.232)	29.3 (1.154)	41.3 (1.626)	53.6 (2.11)	426.8 (16.803)
Average precipitation days	11.1	9.6	11.4	9.5	7.0	3.2	1.3	0.7	1.5	4.8	7.3	9.5	76.9
Average snowy days	13	8	1	0	0	0	0	0	0	0.2	2	8	32.2
Average relative humidity (%)	73	68	62	60	53	40	39	42	45	57	66	73	57
Mean monthly sunshine hours	117.3	125.3	165.1	216.8	303.4	361.8	383.7	365.8	300.9	224.8	149.5	105.9	2,820.3
Source #1: Centre of Hydrometeorological Service of Uzbekistan,[24] World Meteorological Organisation[18]													
Source #2: Pogoda.ru.net (record low and record high temperatures),[25] NOAA (mean monthly sunshine hours, 1961–1990)[26]													

In the area of projected object - on the construction site the gray structure consists of smaller rocks. The water level is 5-6 m.

The area is flat and is located in a 4-5 and 9-storey residential complex. The area is a residential area and there is a small inclination toward the south. It serves to us in the cultivation of a glorified object and its surroundings. This factor is important in engineering improvement works, vertical planning of the area, formation of aryk systems, removal of outer waters from the area.

1.4. Ecological situation.

Almost half of Tashkent city is represented by an oak tree, with an average of 69 sq. m. Of the oasis. Sometimes, especially in the hot summer days, a disadvantageous ecological situation arises in Tashkent. In the city there is a smoky (air pollution) situation where the maximum visual distance is reduced to 1.5-3.0 km. At this time, the Tyan-Shan Mountains, which are clearly visible from the city, are invisible or abnormal.

However, our project is located in the eastern suburbs of Tashkent, bordering with the Kibray district roads in the east. The ecological situation is much better than the city center.

Technogenic effects.

In Yashnabad district of Tashkent, there are many industrial enterprises and factories, which is an important factor for the socio-economic development of the city. It is worth mentioning that factories of “Temirbeton”, such house-building complexes, should be emphasized. Because of the fact that our project is very close to the Tashkent ring road, called "Ahangaran shosse", the traffic noise is not spreaded along with exhaust gases emission.

Transportation is very comfortable around the object. There is Mashinasozlar subway station on the south-west about 400 meters long, and in Parkent market road run a lot of public buses and other private minibuses along the route. This, of course, is an important factor in connecting the city with the provincial districts, the crucial role in the development of transport infrastructure in the region and, in turn, the solution to the problem of urban transit. However, various engineering solutions can be used to reduce the noise from this type of transport. Territory is more technogenic because of the fact that the object is outside of the Tashkent ring road.

CHAPTER II. ARCHITECTURAL-CONSTRUCTIONAL PART

2.1. Residential buildings

Multi-storey apartment buildings occupy an increasing share in the practice of housing construction. Their use can significantly increase the number of apartments in the house, increase the density of urban development and settlements, which contributes to the reduction of the construction area. The latter is of great importance, since the expansion of the territory of cities exacerbates the transport problem, leads to a rise in the cost of engineering networks, increases the distance between housing and places of work and rest, which, in turn, reduces human free time.

Accommodation of residential buildings on the territory of cities and rural settlements should be carried out in accordance with the construction projects in accordance with the requirements of the SHNK 2.08.01.05

The number of storeys, the length of and compositional and planning building solutions are determined in accordance with the building project, according to the requirements of these rules, fire and seismic safety requirements (SHNK 2.01.02 and KMK 2.01.03).

For mass housing construction should be applied buildings no higher than 4 storeys; for nekanalizovannyh urban and rural settlements-1-2 floors. Buildings of 9-12 floors can to be used for the development of centers large cities; buildings 16 floors it should be used for special justification and resolution of state architectstroy. Specialized residential apartment buildings for settlement the elderly and disabled, and boarding houses should not be above 3 floors.

Apartment projects and specialized residential buildings should be accompanied by operating instructions, including residential and non-residential public premises. In the instruction all data must be specified, required by the operator and repair organizations, tenants of built-in and attached service facilities to ensure safe operation.

When reconstructing a residential building, the project should take into account changes in its design scheme that have arisen in the process operation, including the emergence of new openings (additional to the original project), change the loads on

the structure buildings. Reconstruction project should be agreed in accordance with the established procedure with the interested organizations, including owners of the home.

Residential buildings should to be designed, constructed and equipped in such a way that eliminate the risk of injury residents when moving inside houses (apartments), as well as the entrances to the exits of the houses, when using its elements and engineering equipment, local areas.

Types of houses

3.1. Residential houses are divided into the following main types:

- single-family (single-family) stand-alone on land;
- blocked consisting of 2 or more apartments, each with direct access on the apartment land;
- multi-family (one – and multi-section, gallery, space gallery, section category).

Definitions of types of houses are given in the mandatory Annex 1.

Types of houses and apartments, the composition and area of the premises of apartments, premises for economic purposes specific construction conditions set the design task in accordance with the data the normative document and the project of building on social and demographic requirements.

In design of single-family and blocked residential buildings of individual construction with land requirements and requirements must be taken into account parameters of formation of residential formations according to the SHNK 2.07.01 (indent from the roadway of streets, distance between houses, houses and economic buildings, permissible number of storeys, insolation, etc.)

Apartments

The apartment must include living rooms, kitchen, front, toilet, bathroom or shower room, built-in wardrobes, summer room. Area of social apartments ("municipal") housing stock ordinary (standard) class comfort, which is being built at the expense of state or local budget, take into account the indicators of the table. 1 (table.1).

Table 1

Apartment types	Family members, people.	The size of the apartment* (without summer premises), m^2	Including residential area, m^2
1 room apartment	1	28-30	14-16
1 room apartment	2	32-36	18-20
2-room apartment	3	48	30
3 room apartment	4	64	40
4-room apartment	5	80	53
5-room apartment	6	96	66
6-room apartment	7(8)	114	78

* Normalized area of apartments includes residential and auxiliary premises (excluding summer rooms and cold storerooms).

Notes: 1. Table data.1 apply to all types of social" apartment housing in cities and rural areas. The area of apartments is given on the basis of social norm of the area of housing for 1 resident – 16 m2 (except for one room for 1 person).

2. In specific urban conditions, indicators of the area and composition of the premises of apartments are determined by the design task taking into account the socio-economic the situation, demographic characteristics of the population, resource supply of construction. The task of the design set the composition and area of apartments for complex families from 3 generations (taking into account the needs of the elderly and disabled on wheelchairs).

In a Studio apartment 1 pers. room size needs to be-not less than 14 m2, for 2 people-not less than 18 m2. The total area of room 2- 3 x bedroom apartments should be at least 16 m2. The area of a living room-bedroom for 2 people should not be less than 12 m2, for parents ' bedroom recommended 13-14 m2. Area bedrooms for 1 person should not be less than 8 m2, in the conditions of reconstruction, at the device of floors are allowed 7 m2 (if the apartment has other residential premises). Bedrooms and alcoves in all types of apartments should be impassable. Kitchen area should be, as a rule, not less than 8 m2. In terms of reconstruction for one-room apartments allowed to design kitchen and kitchen niches of 5 m2. In the conditions of

construction climate zone I living room-bedroom for 1 person. should be 9- 10 m^2, for 2 people not less than 14 m^2, a living room in a Studio apartment should be 16-18 m^2.

2.2. The purpose of the work – general information.

The **object** is the development of a project proposal for the "Modern Center of the modern mahalla with a residential complex", located in Makhtumkuli street, Yashnobod district, Tashkent city.

2.3. General description of the building

1. **Locational information**

   Address: the object located in Mahtumkuli street, Yashnabad district, Tashkent city

   Type of the object: this 6-storied apartment building consists of 26 flats, including service shops in the first floor, basement, and mansard.

   The position of the spot in urban planning: The projecting building is surrounded with new apartment buildings, and “Horev” Medical center, as well as new motorway cross-section.

   Building’s borders:

   the north- small ring road, Mahtumkuli street,

   the south- apartment house

   the east- apartment house

   the west – apartment building

2. **Landscape and its evaluation.**

   The territory of the object is in peace, without slops. The territory is categorized as a comfortable zone in terms of urban design. There is no need to demand to operate special vertical planning work. There is no erosions and karst signs.

3. **Climate information (Building code 2.01.01-94)**

   The object is located on the 4th climate zone which is dry hot zone. Description of this zone as follows:

The weather- the hottest month of the year is July can be hot as 42°C. The coldest time is in January. The weather can be -15°C cold.

Wind- wind rose is in the south-western direction, its speed can reach 15 m/s

Snow load- 50 kg/m^2

Wind load- 38 kg/m^2

Seismicity- according to Tashkent seismic zone map, its maximum reach is **8-point** magnitude.

4. **Degree of supplementing with transportation and other engineering infrastructures of the territory**

Public transportation- along the ring road many public transportations, mini buses run. Moreover, the closest subway station "Mashinasozlar" is available. So, the transportation supplement is very high.

All engineering network systems are installed mainly in the underground.

5. **Other characteristics of the area**

Chemical dangerous objects – are not available.

Ground water level- is 10-12 m. Seasonal rise and fall of the ground water is 1.2-1.4 meters. Its chemical compound: salt and other aggressive elements' amount is in balanced degree.

Ground information- the category is II.

Ear coating freezing layer is 71 sm. based on the Building Code 2.01.01-94.

Flood threat is not available. Karst progress is not available.

Swamp development is not existed.

The type of building is a residential building.

The constructive scheme of the building is rigid, complex construction.

The shape of the building is poligonal 47.1x20.4 m.

The building has 6 floors, and a basement.

Ceiling height: 3.0 m.

1st floor - 4.0 m.

2nd floor - 3.0 m.

3rd floor - 3.0 m.

4th floor - 3.0 m.

5th floor - 3.0 m.

6th floor - 3.0 m.

The height of the building is 23.2 m.

 foundation – flat slab reinforced concrete

 walls - brick, thickness 380 mm;

 Block walls - Brick thickness of 120 mm;

Iron-concrete rams:

 Columns - monolithic reinforced concrete, cross- section size 400x400 mm;

 girders - monolithic reinforced concrete, cross- section size 400x400 mm;

 floor closing slabs - made of polyethylene porcelain hollow porous slabs, height - 220 mm, in some places - monolith;

 Roofing - consists of reinforced concrete hollow blocks, height - 220 mm, in some places - monolith;

 Abrasive cover – roof timber, 2 tier;

 Partial coating is made of 2-wire profile, water dranage is organised;

 stairs – prefabricated monolithic reinforced concrete

 paving - with asphalt concrete, width of 1.0 m, not less than 3%;

 Heating support – connected to central heating system;

 Ventilation system - through ventilation pipes on the walls;

 gas supply - residential gas supply on the internal system;

 water supply - centralized urban network;

 sewerage - connected to centralized city network;

 Electricity supply - urban electric grid, distribution unit.

2.4.Architectural planning solutions

In design of internal apartments of the building, all modern planning solutions are implemented, they are:

Basement floor – utility cervice rooms and storerooms;

Floor 1:

- Trading hall;
- corridor;
- office;
- 2 W.Cs;
- Small food service(dining room);
- pantry;
- staff room;
- staircase L-1, L-2;

In block B;

- Corridor;
- Men’s barber.
- Women’s barber
- Fashion house
- Home appliances repairshop
- Staff room
- Pantry
- 2 W.Cs
- Dining hall
- Laundry Service
- Corridor
- Staircases L-1, L-2

Typical floor plan includes:

Double room “a” type

- bedroom
- parlor;
- kitchen dining room;
- W.C;
- balcony.
- Bathroom
- corridor

Double room “b” type

- parlor;
- corridor;
- kitchen-deining room;
- bedroom.
- W.C;
- Bathroom;
- Balcony;

Three room flat includes:

- parlor;
- corridor;
- kitchen-deining room;
- 2 bedrooms.
- W.C;
- Bathroom;
- Balcony;
- Staircase hall

Block “B” is also include above pattern of the apartment planning

The functional premises must be up-to-date according to their technical requirements of the current standards.
The basic requirements for the design of the building must be in accordance with SHNK 2.08.01-05 "Residential buildings", and the building must meet the fire requirements and seismic requirements in accordance with other technical requirements.

2.5. Technique economic index

Economic technical assessment of the task of the proposed plan of the residential buildings embodies the capital resources, effects and costs allocated to the construction. Useful area and shared space attitudes are crucial in planning individual rooms. Planning rationality coefficient:

$K_1=S_{us}/S_{total}$;

Volume factor:

$$K_{1=}V_{cons}/S_{total}\ ;$$

Here: S_{us} - useful area;
S_{total} – total area;
V_{cons} – construction volume;

№	Name	Unit	Amount
I. By number			
1.	Total area	м^2	5811
2.	Useful area	м^2	4634
3.	Construction site area	м^2	960.8
4.	Construction volume	м^3	24373.7
5.	Number of storeys	floor	6
II. By quality degree			
1.	Planning rationality coeff. $K_1=S_{use}/S_{total.}$	М^2/ м^2	0.79
2.	Volume coeff. $K_2=V_{cons.volume}/S_{total.}$	м^3/ м^2	4.19

2.6. Planting and landscaping work

Planting and landscaping of the surrounding area will provide more convenience and will also have a positive impact on human health. Each settlement, an oasis surrounded by a public building, and a splendid courtyard, are designed to build small architectural forms. It is desirable to place the resort in the most green part of the yard.

It is recommended to plant ornamental trees, shrubs and flower gardens in the premises of the building. Their functions are aesthetically spectacular, safe ventilation, noise, and solar radiation protection.

It is important to improve the area of the building, ie roads, trunks, parking lots, and restoration of the building floor. The beaches are 1.25-1.5m wide, and the embellishments in them provide a beautiful view. Car parking areas and parking lots are asphalted. As a result, we get an oasis and a well-equipped area. These are recommended for all residential and public buildings.

The contemporary feature of modern landscaping is that it uses green pastures to improve the daily life of people, recreation, work, and the use of green space in the field of human activity: in factories and factories, at enterprises, in kindergartens and in school buildings, in residential and public places. One of the important aspects of green planting of the city is the creation of large green crops and a green pile of fresh air. One of the tasks of external beautification is to increase the variety and to express artistic expression of open landscapes and structures. This function was solved by means of the open space in the form of a functional magnet.

The peculiarity of the city's architectural environment, its uniqueness, its magnificence, along with landscaping, provides the means of external beautification, which works on the ground surface. The functions of solving aesthetic, functional elements of urban design are the small architectural forms.

These areas should not only fit into sanitary-hygienic conditions, but also should be equally well-arranged.

Depending on the movement of the passengers, the width of the roads in the green areas of the microcosms is determined by the following: - 3 m of transit routes used throughout the year; Seasonal transit and sightseeing season - 2,25-1,5 m; The width of the yearly and seasonal widths should be 0.5-0.75 m. These widths are the same as the one with a moving width of 0.75 m. must be. The width of the seats is 1.5 m. is permitted. Width 0.5 m. where the tiles are to be laid on the project.

There are different options for land coverage. However, they must meet sanitary-hygienic standards and defined functional responsibilities.

For example, gardens and alleys are decorated with decorative gravel, as they can cause slopes in the direction of internal water pipes because of the thickness of these stones. In the same variant, a single cement panels can be laid. Such coatings are to be carried out there or placed on the plates. The smaller cores are flat and the sand plaques are flat. It is a nice place to lay the ground between the ground and the ground. It is not recommended to cover the asphalt in the parks, as in large alleys.

Small architectural forms can clearly indicate the current scene. With the help of these small architectural forms, the city streets, highways and suburbs are beautifully decorated.

The architecture of small architectural forms should correspond to the same target, and then it will respond to its goals, expressing the peculiarity of its historical color, its natural environment, its local national traditions.

Small architectural forms used to beautify the territory of Mikrarayan can be divided into the following groups:

1. Small architectural forms used for pure benefits. Such seats, as well as the elements of urban furnishings, should be used for practical use by the population,

such as seats, waste containers, indicators, microwave (stairs, trade points, blossoming, type of houses).

2. Decorative and qualitative small architectural forms: these are used for the aesthetic effect of the device, the devices (decorative walls, swimming pools, fountains). Many of these small architectural forms can be created in the round.

This neighborhood is a modern neighborhood center with a shopping and entertainment complex for residential complexes, as well as providing all the comforts for housing and comfort for the population.

Most of all, it is projected to build children play ground area with all facilities in front of the building. This creates a lot more convenient to apartment owners and their children. Certainly, all the parametres of this small spot construction should meet requirements of building standards of the Republic of Uzbekistan.

CHAPTER III. STRUCTURAL CALCLUATION PART.

3.1. Structural description of the building

Object: Project suggestion of six storied apartment building in Makhtumkuli street, Yashnabad, Tashkent city.

Seismicity- according to Tashkent seismic zone map, its maximum reach is **8-point** magnitude.

Ground category by seismicity – II

Sedimentary ground type – II

Wind- wind rose is in the south-western direction, its speed can reach 15 m/s

Snow load- 50 kg/m^2

Wind load- 38 kg/m^2

Building type- residential

Structural scheme of the building – rigid, complex structure.

Shape of the building – poligonic 20.4x47.1 м.

Number of storeys – 6 storied, with basement.

- Ceiling height: 3.0 m.
- 1st floor - 4.0 m.
- 2nd floor - 3.0 m.
- 3rd floor - 3.0 m.
- 4th floor - 3.0 m.
- 5th floor - 3.0 m.
- 6th floor - 3.0 m.
- The height of the building is 23.2 m.

Foundation blinding is 100 mm thick made by concrete B7.5.

Foundation is slab shaped reinforced concrete mat, height is 500 mm. Reinforced with Ø25AIII reinforcement net in 200x200 мм stepped order. The depth of the foundation is -3.5 m below than “zero level” and 500 mm deeper than basement floor.

- Walls– bricken, 380 мм thick;
  - Partition walls – bricken 120 мм thick;

Ferroconcrete frame:

- - columns– monolith, reinforced concrete, crossectional size 400x400 mm;
- Columns - monolithic reinforced concrete, cross- section size 400x400 mm;
- girders - monolithic reinforced concrete, cross- section size 400x400 mm;
- floor closing slabs - made of polyethylene porcelain hollow porous slabs, height - 220 mm, in some places - monolith;
- Roofing - consists of reinforced concrete hollow slabs, height - 220 mm, in some places – monolithic area;
- Abrasive cover – roof timber, 2 tier;
- Partial coating is made of 2-wire profile, water dranage is organised;
- stairs – prefabricated monolithic reinforced concrete
- paving - with asphalt concrete, width of 1.0 m, not less than 3%;
- Heating support – connected to central heating system;
- Ventilation system - through ventilation pipes on the walls;
- gas supply - residential gas supply on the internal system;
- water supply - centralized urban network;
- sewerage - connected to centralized city network;
- Electricity supply - urban electric grid, distribution unit.

3.2. The calculation of first floor column in projected building

Calculation of column by B-3 axis

The joists of the columns are 0.6 m upper than floor closing slabs. The girders are laying on the shoulder part of the columns.

Finding loads and forces is to collect all the loads' values of floor closing and roof closing weights. We need to find load collection area of the column:

$$l_1 * l_2 = 3.8 * 4.8 = 18.24\ m2$$

Cross-sectional size of the girders 40x40 sm. In this size, the weight of the 1 r.m. girder is:

$$a * b * p = (0.4 * 0.4 * 25 = 4kN$$

The second girder's weight is the same as the first one= 4 kN

We accept the measures of the column is $b_y x h_y = 40x40$ sm . The calculating length of the column for 2,3,4,5th floor is

$l_0 = Hfl = 3.3\ m.$

For the 1st floor we take l_0=*2.8 m*

The calculated weight of the columns for 2,3,4,5th floor:

$$N_y = b_y * H_y * H_{fl} * p * \gamma_f = 0.4 * 0.4 * 3.3 * 25 * 1.1 = 14.52\ kN$$

For the 1st floor column:

$$N_y = b_y * H_y * H_{fl} * p * \gamma_f = 0.4 * 0.4 * 2.8 * 25 * 1.1 = 12.32\ kN$$

Loads falling to the column from the roof closing

№	Load types	Balanced load kN	γ_f	Calc. load kN
	Permanent loads:			
1	Cement plastering *t=20* mm, $\rho = 20\frac{kn}{m^3}$	0,15*18.24=2.73	1,3	3,54
3	Thermo-insulation layer *t=100*mm, $\rho = 5\frac{kn}{m^3}$	0.5	1.2	0.6
4	Vapor proof layer (1 layer of ruberoid)	0.05*18.24=0.91	1.2	1.09
5	Reinforced concrete slabs *t=220*mm, $\rho = 25\frac{kn}{m^3}$	4*3.8=15.2	1.1	110.35
6	1st girder	4*4.8=19.2	1.1	21.12
7	2nd girder	5.325*8.1=43	1.1	16.72

		.13		
	Total:	**138.86**		**153.42**
8	**Temp loads** Shorf time 0.5*70% Long times 0.5*30%	0.5*18.24=9.12 0.35*48.6=17.01 0.15*48.6=7.29	 1.4 1.4 1.4	 12.76 23.814 10.206
	Full load	**147.98**		**166.18**

Calculated weights for columns are in 2,3,4,5th floors:

$N_y = b_y \cdot h_y \cdot H_{fl} \cdot \rho \cdot \gamma_f = 0{,}4 \cdot 0{,}4 \cdot 4{,}8 \cdot 25 \cdot 1{,}1 = 21{,}12$ *kN*

For the 1st floor:

$N_y = b_y \cdot h_y \cdot l_{oy} \cdot \rho \cdot \gamma_f = 0{,}4 \cdot 0{,}4 \cdot 3{,}36 \cdot 25 \cdot 1{,}1 = 14{,}784$ *kN*

Roof load pressing on the column

$N_{t.yu.} = 273{,}75$ kN, a long-acting part of this load $N_y^t = 239{,}73 + 10{,}206 = 249{,}936$ kN

Shortcut effect:

$N_q^t = 23{,}814$ kN

Collecting loads from the floor ceilings.

№	Name	Normal load $\frac{kN}{m^2}$	γ_f	Calculated load $\frac{kN}{m^2}$
1	Permanent loads: Concrete floor load t=2 sm, $\rho = \frac{20kN}{m^3}$	0,4*18.24=7.29	1,3	9.47
2	Heat-insulating layer t=80 sm, $\rho = \frac{11kN}{m^3}$	0,88*18.24=16.05	1,2	19.26
3	concrete slab $\rho \cdot h_{pl} = 25 \cdot 0{,}09$	109,35	1,1	21.12
4	1st girder	19.2	1,1	35,64
5	2nd girder	15.2	1,1	16.72
	Total	155.74		174.37
	Temporary loads Longterm part Short term part	9.4*12.24=115.05 6,58*12.24=80.5 2,82*12.24=34.5	1,2 1,2 1,2	138.06 96.63 41.41
	Full load	270.79		312.43

Loads from floor closing slabs:

$N_t^{o.yo} = 828{,}1\ kN$, a long acting part of this load:

$N_u^{o.yo} = 279.89 + 383.7 = 663.59\ kN$

Shortcut effect:

$N_q^{o.yo} = 279.89 + 164.46 = 444{,}35\ kN$

N_4	IV
N_3	III
N_2	II
N_1	I

In order to find the sum of the loads falling on the first floor column, we add up loads by floors, sequentially.

Calculated full load:

$N^m = (N_t^{o.yo.} + N_u)\cdot(n_{fl} - 1) + (N_{t.yu.} + N_{u_1}) == (828{,}1 + 21{,}12)\cdot(4-1) + (273{,}75 + 14{,}78) = 2836{,}19\ kN$

A long acting part of this load:

$N_{u.m.}^t = (N_u^{o.yo.} + N_u)\cdot(n_{fl} - 1) + (N_y^t + N_{u_1}) == (663{,}59 + 21{,}12)\cdot(4-1) + (249{,}936 + 14{,}78) = 2318{,}85\ kN$

Calculate the first floor column for durability.

We calculate the column by taking into account the random shoulder part according to the KMK requirements. We take the bigger value of the following expression:

1) $\frac{h_{ust}}{30} = \frac{40}{30} = 1{,}33\ sm$

2) $\frac{l}{600} = \frac{480}{600} = 0{,}8\ sm$

3) 1 sm

$l_a = 1{,}33\ sm$ -accepted.

Certain reinforced concrete constructions with cross -sectional shape is rectangular, reinforced with A-I, A-II, A-III class armature; estimated length is $l_0 < 20h_1$, random shoulder is $e_0 = e_a < \frac{l}{30}$ are conditional on the central compressed elements. In fact, the central stress in building structures is not clearly seen; the structures are always in the state of collapse with random shoulder.

Considering the above, the strength of the compressed elements' math expression can be as follows.

$N < (\cdot \varphi[R_1 b \cdot A_1 b + R_1 sc\ (A_1 s + (A_1 s)')]$

Here: N – linear pressing load, $A_b = h_y x b_y$ - cross –sectional area of the column, η - factor of partial working condition: its value is: if $h \le 20\ sm$, $[= 0{,}9$ and $h > 20\ sm$ is taken. φ - a long acting part of the load which considers flexibility, reinforcing factors and can be found in this formula:

$$\varphi = \varphi_b + 2\frac{(\varphi_r - \varphi_b)R_{sc}(A_s + A_s')}{R_b \cdot A_b} < \varphi_r$$

$$\mu = \frac{(A_s + A_s')}{A_b} = 0.01$$ -accepted.

μ - factor for armed cross-sectional area, its value:

$\mu_{min} = 0.005 < \mu < \mu_{max} = 0.035$.

Considering the above, the formula is:

$$\varphi = \varphi_b + 2\frac{(\varphi_r - \varphi_b)R_{sc}0{,}01}{R_b}$$

φ_b and φ_r Coefficients are the quantities depending on the strength and the elasticity of the part, their values are taken from the table of the book prof. Nizomov.

Determination the ratio of loads:

$$\frac{N_{u.m.}^{to\cdot liq}}{N^m} = \frac{2318{,}85}{2836{,}19} = 0{,}82$$

We define the elasticity of the column

$[= l_{\downarrow 0/h} = 336/40 = 8.4$

Depending on these two values we accept the value of φ_b and φ_r factors:

$\varphi_b = 0{,}904 \varphi_r = 0{,}9115$

Taking into account above values, we will define the value of the φ .

$$\varphi = \varphi_b + \frac{2(\varphi_r - \varphi_b)\cdot R_{sc}\cdot 0.01}{R_b} = 0.904 + \frac{2(0.9115 - 0.904)280\cdot 0.01}{14.5} = 0.907$$

We accept - $\varphi = 0.907$. $\varphi \le \varphi_r$

$$\left(A_s + \acute{A}_s\right) = \frac{\frac{N_T}{(\cdot\varphi} - A_b \cdot R_b \cdot \gamma_{b2}}{R_{sc}} = \frac{\frac{2836.19\cdot(100)}{1\cdot 0.907} - 40x40\cdot 14.5\cdot 0.9(100)}{280(100)} = 37.11\ sm^2$$

As a result, we accept following armature from assortment table.

$8\text{Ø}25$ A-II $A_s + \acute{A}_s = 39.27 sm^2$

We will check the priority of the cut section.

$$N = (\cdot\varphi[R_{\downarrow}s\cdot\gamma_{\downarrow}b2\cdot A_{\downarrow}b + (A_{\downarrow}s + (A_{\downarrow}s)\cdot)R_{\downarrow}sc] = 1\cdot 0.907[14.5\cdot 0.9\cdot 1600 + 39.27\cdot 280](100) = 2891.12\ kN$$

$N = 2891.12kN > N_T = 2836.19kN$

Column's Priority condition completed. We will define the true armature coefficient of the cross sectional surface of the pillar.

$$\mu = \frac{(A_s + \acute{A}_s)}{A_b} = \frac{39.27}{1600} = 0.0245$$

$0.005 < 0.0245 < 0.035$

Based on the condition of welding the armature we accept: *d=8 mm:*

$$\frac{d}{4} = \frac{25}{4} = 6.25\ mm$$

Distance between every step of them, in welding carcass is *20d,* in knitted carcass system, it should be *15d.* In both cases, the distance among steps should not be over than 50 sm. long.

CHAPTER IV.

ORGANIZATIONAL – TECHOLOGIC PART

4.1.0 Technological design

Technological design is a part of the design documentation developed for construction of the facility. Technological designing of processes should be provided at all stages of project development.

Construction technological design includes:

• Project construction organization

• Production works project

• Technological maps

• Labour processes maps

• Operations technological scheme

Project construction organization specifies the construction duration, its cost, the need for materials and necessary equipment.

The project construction organization includes:

▪ Work execution schedule indicates the timing and sequence of construction of all buildings and structures comprising the complex, with the distribution of capital investments and construction-installation works. for certain constructions. Work execution schedule is executed for complex construction at preparatory period additionally.

▪ General construction plans for the preparatory and main periods of construction. The plans include all of the existing and the construction of buildings, roads, temporary and permanent engineering networks.

▪ Requirements in the constructions, products, materials, equipment

▪ The demand graph for the main construction machines and vehicles for the entire period of construction

▪ The demand graph for workers of the main building specialties

▪ Explanatory note.

The note includes the conditions construction characteristic, the adopted production methods justification and the possibility of combining various work deadlines, requirements in materials, basic mechanisms, vehicles, and energy

resources. The proposed construction timing of the entire complex must be justified in the explanatory note. The construction management project is required for the customer, contracting organization and organizations that provide financing and logistical support to the construction of the object. The general contractor develops the production works project for the entire object work complex and for the preparatory period based on the project construction organization.

The production works project can be developed for:

- Building or structure construction
- Construction of the building parts
- Certain technically complex construction works execution
- Preparatory period work

The production works project is developed to:

- Determine the most effective ways to perform construction and erection works
- Reduce all types of costs
- Reduce the duration of construction
- Use the best mechanization
- Ensure the work safety

Initial dates for the production works project development are:

- The task for designing the production works project from the customer;
- Previously developed project construction organization for the object construction
- Required project documentation (working drawings, calculations)
- The specific construction
- Documentation and calculations are carried out for the similar building construction

The period of the development of the production works project depends on the characteristics of the construction, installation works and their complexity.

The production works project includes:

- Work execution schedule establishes the sequence and timing of all work with the greatest possible in their combination, normative operation time

of construction machinery, the need for labour and means of mechanization

▪ Construction master plan. It includes:

• the construction site boundaries, the types of barriers

• permanent and temporary networks and communications

• permanent and temporary roads

• schemes of vehicle movements and construction machinery

• the place of construction machinery and hoisting mechanisms installations with an indication of their pathways and action areas

• construction and temporary buildings and structures

• washing vehicles zone

• the domestic premises location

• the path of worker movements, passages in buildings and structures

• power supply and lighting sources at the construction site

• site and facilities for materials storages

• the location of fire-fighting water supply and hydrants;

• checkpoints security

▪ Technological maps and charts for specific works or processes performance

▪ Products and materials receipt schedules

▪ The requirement graphics for workers at the facility

▪ Construction machines schedules

▪ Decisions on the geodetic works production

▪ Decisions on safety

▪ The technological equipment and tooling list for construction works execution

▪ Explanatory note including technical and economic indicators

The production works project is designed for the building as whole, individual cycles of the construction of buildings, complex construction works. The production works project is developed at the stage immediately preceding manufacture of the works.

The object construction is allowed only on the basis of the preliminary decisions made in the project construction organization or the production works project.

Technological maps are designed for complex processes and simple construction works.

Labour processes maps are prepared to execute simple technological processes. The technological schemes are designed for workers in order to clarify the optimum performance of individual operations. Construction of buildings is carried out by flow-line method with a maximum works combination performed on the buildings. Construction works beginnings in each case are shifted relative to the other for the work production duration of a zero cycle of the previous case.

4.2 Technology and organization of work.

All repair and construction works are combined in cycles, performed in technological order.

Cycle 1. Dismantling of engineering equipment.

Cycle 2. Dismantling of building structures.

Cycle 3. Device and reinforcement designs.

Cycle 4. Installation of building structures and repair of walls.

Cycle 5. The device of the roof.

Cycle 6. After installation work.

Cycle 7. Installation of sanitary equipment.

Cycle 8. Interior finishing works.

Cycle 9. Repair of facades.

The cycle 10. Improvement of the yard area.

4.2.2. Calculation of the network schedule.

As a model, reflecting the technological and organizational relationships of the process of construction works, a network model is used. Network model is represented as a graph consisting of arrows and circles. A network graph is a network model with the calculated time parameters. The concept of "work" and "event"is the basis of network construction.

Work -is a production process that requires time and material resources and leads to certain results.

The event -is a certain state, the result of the work achieved in the course of the complex. The event has no duration and displays a certain fact.

Features of network schedules: the presence of the relationship between the work and the technological sequence of their implementation, the possibility of establishing works, the completion of which depends on the duration of installation, the possibility without sorting out the sequence and duration of work in order to better use of organic resources.

The calculation of the network graph is performed directly on the graph by sector methods. In this method, calculation of strict adherence to the rules for the encoding of events is not required.

4.2.3 Calculation of the volume of work.

First, we will determine the amount of work and labor costs, and then by calculating the composition of the link and the duration of each work. Table 4.1

№	base	Job name	Unit	Number	Labor spending person /hour ratio	Whole volume labor spending Person/days	Row member	Shift number	Done (days)
1	2	3	4	5	6	7	8	9	10
1	21-16/5-2	Ditch working	-	180.1	0.17	3.83	2	1	2
2	17-44a	Ground removing	т	9	0,45	0,28	1	1	2
3	20-2-15	Formwork	-	9	0,62	0,38	2	1	2
4	19-15/3-Г	Laying concrete of basement	$М^3$	9	0,87	0,45	2	1	1
5	17-119/33-0	Building basement columns	$М^3$	37	1,09	5,04	2	1	2
6	17-58	Building basement girders	$М^3$	112,8	0,67	4,23	2	1	2
7	19-31-78	Building basement walls	М	42,4	0,77	4,08	2	1	2
8	20-1-70 20-1-61	Floor closing for basement	$м^2$	325,5	0,06	4,08	2	1	2

9	1-5.п.2	Knitting armature carcass for 1st	m	2,9	0,154	0,411	3	1	1
10	20-1-61	Formworking 1st floor pillars	$м^2$	31,56	0,175	0,469	3	1	1
11	1-6,Т.2 п-26-АБ техн.4.3	Laying concrete on pillar boxes 1st floor	$М^3$	4,3	0,438	0,24	3	1	1
12	20-1-61	Knitting girders carcass 1st floor	м	99,74	0,065	0,404	2	1	1
13	1-14-8 1-14-1	Laying concrete mortar for girders' frame boxes	$М^3$	7,2	1,5	1,826	2	1	1
14	7-1/1-а	1st floor wall build (bricks)	m	74	0,182	1,68	2	1	1
15	6-1/18	Closing 1st floor ceiling with slabs	$м^2$	220,7	0,17	4,68	2	1	2
16	5-1-1а	Knitting pillar reinforcing 2nd fl	м	399,6	0,559	27,92	4	1	7
17	6-18/5-а	Formworking for 2nd floor	$м^3$	41,62	0,44	2,28	2	1	1
18	23-39/17-а	Laying concrete mortars form boxes 2nd floor	$м^3$	24,46	3,37	10,52	4	1	3
19	20-1-41	Building 2nd floor walls (bricks)	м	3,94	5,2	2,56	2	1	1
20	1-3-18	Formworking 2nd floor girders	$м^3$	288,8	3,25	45,13	6	1	8
21	2-11-4А	Cloosing with slabs 2nd fl	$м^2$	162,9	0,14	2,85	2	1	1
22	3-1-12	Installing reinforcing frame on the 3rd floor	m	10,46	1,2	1,57	2	1	1
23	4-2-2	Building frame structure on 3rd floor	м	52,34	5,6	36,64	6	1	6
24	4-2-16	Installing built-up slabs 3rd loor	m^2	4,57	8,4	4,79	2	1	2
25	4-2-2	Installing built-up stairs in 3rd	-	52,34	1,4	9,16	4	1	3
26	2-1-2	build brick external &internal walls 3rd	$м^3$	29,34	0,8	30,52	6	1	5
27	7-6	Build 4th floor columns	м	210,7	2,8	73,74	10	1	7
28	4-1-10	Staircase area installing 4th fl.	-	9	2,28	2,56	4	1	1
29	4-1-9	Building external-internal brick walls 4th fl.	-	9	2,28	2,56	4	1	1
30	5-1-10	Building 4th fl. beams	т	0,075	3,4	0,32	2	1	1
31	4-2-2	Install 4th fl. slabs	$М^2$	34,15	5,6	23,91	6	1	4

32	4-2-16	5th floor column building	м	17,42	8,4	18,29	4	1	5
33	4-2-2	Build brick walls in 5th floor	м	34,15	1,4	5,47	6	1	1
34	4-1-9	Install concrete slabs 5th fl.	-	6	2,28	1,71	4	1	1
35	5-1-10	Laying seismic belt on 5th fl.	m	0,3	34	1,275	2	1	1
36	7-6	Build metallic carcass for 6th fl. pillars	м	286,4	3,2	104,56	10	1	10
37	4-1-10	Build concrete columns of 6 fl.	m	6	2,28	1,71	4	1	1
38	4-1-9	Build brick walls of 6th fl.	m	6	2,28	1,71	4	1	1
39	7-6	Building beams for 6th fl.	м	286,4	3,2	104,36	10	1	10
40	5-1-10	Installation staircase 6th fl.	-	0,3	34	1,275	2	1	1
41	10-8/5-a	Installation concrete slabs for 6th floor	$м^2$	634,4	0,14	11,10	4	1	3
42	10-12/1-a	Laying concrete seismic belts on 6th floor.	м	634,4	0,32	25,38	4	1	6
43	4-11/3-1	Installation metall fences on the 4th floor stairs	м	634,1	0,19	15,07	4	1	4
44	8-24-59	Building attic walls	m	6	3,0	1,125	2	1	2
45	6-17/1-a	Laying concrete attic columns	м	277,2	1,62	56,13	10	1	6
46	6-17/1-a	building seismic belts for attic walls	м	252,2	1,62	51,07	10	1	5
47	6-17/1-a	Vitrage installation	$м^2$	252,2	1,62	51,07	10	1	5
48	6-17/1-a	scleton crate for roofing	$м^2$	252,2	1,62	51,07	10	1	5
49	7-32-91	Roof metallic coverage	$м^2$	136	1,52	25,84	4	1	1
50	7-29/9-8	installing rain-water drainage	m	199	1,3	32,34	6	1	5
51	15-16/4-a	Laying cement buckle	$м^2$	267,6	0,54	18,06	4	1	5
52	13-1/5-6	installing thermo-saving materials	$м^2$	255,2	0,5	15,95	4	1	3
53	13-1/6-8	Installing doors and frames	-	232,5	0,75	21,8	4	1	5
54	13-1/10-a	Laying glazed tiles in W.Cs	$м^2$	565,6	1,2	84	84	6	14
55	11-68/1-63	Finishing elevator tower	$м^2$	2002,3	0,2	50,03	10	1	9
56	11-64/14-a	Plastering work of the walls	$м^2$	3015,5	0,241	90,84	10	1	5
57	12-13/11-б	Installing joists for parquet floor	$м^2$	5016,8	0,26	163,05	10	1	16
58	13-7/2-б	Installing elevators	-	840,2	0,457	47,96	8	1	6

59	5-1	Laying ceramic floors' plates	м^2	1420,2	0,105	18,64	4	1	5
60	5-18/4-13	Installing parquet floors for stories 1 to 6	м^2	710,1	1,21	107,4	8	1	13
61	5-18/10-a	Glazing parquet floors	м^2	133,08	0,102	8,97	4	1	3
62	P-16-57	Installing water& gas tubes	m	24	3,11	9,33	4	1	2
63	P-17-56	Installing sewage tubes	m	24	2,45	7,35	4	1	2
64	P-17-50	Heating tubes installation	m	24	2,45	7,35	4	1	2
65	P-17-57	Finishing basement walls with marble slabs	м^2	24	5,75	17,25	6	1	3
66	P-17-31	Installing toilet pans	-	2	1,45	4,35	2	1	2
67	17-13/36-a	Install wash-basins	-	137	2,44	41,78	8	1	5
68	15-1-20	Making the facade thermal insulated	м^2	1420,2	0,12	21,30	4	1	5
69	242/8-7	Install wash-basins	-	1451,8	0,6	108,8	10	1	11
70	15-1-30	Installing stove pipes	-	1451,8	0,35	63,52	10	1	6
71	13-8/2-a	Install bathtubs	-	101,5	0,45	5,74	2	1	3
72		And other				131,45	10	1	13
73		Landscaping				216,90	20	1	13
74		Object put in expluatation					2	1	4

4.3. The need for materials.

The consumption of materials per unit of volume of work is determined by the normative reference KMK. part-4 "Collection of unit prices for repair and construction work for UZB" on production standards.

The total material requirement is determined by the bill of materials and structures. The maximum daily consumption is determined by dividing the total required amount of material by the number of days of production of long-range operation (determined by the network schedule) during which this material is consumed.

Materials consumption **Table 4.3**

№	Name	Unit	Numbers
1	Concrete	м^3	210
2	Metal rod	100kg	78,76
3	Formwork	м^3	860.5
4	Staircase	pieces	21
5	Landing	pieces	21
6	Plates	pieces	312
7	Cement mortar	м^3	252,76
8	Glazing	м^2	602,28
9	Sand	м^3	6,97
10	Haydite	м^3	6.97
11	Board III with (25-32 mm)	м^3	2.56
12	Flooring varnishes for the preservation of	м^3	18.17
13	Glue for parquet	т	0,70
14	Parquet	м^2	1448.2
15	Tiles for cap	м^2	102.5
16	A solution of lime	м^3	27.4
17	Chalk paste	kg	1251

18	Putty Cooper	kg	105.36
19	Glue painting	kg	45.1
20	Paints dry	kg	85,28
21	Copper sulphate	kg	30.1
22	Soap economic	kg	30.1
23	Paint PVC	kg	856,56
24	Putty PVC	kg	174.22
25	Primer PVC	kg	217.77
26	Oil varnish	kg	295,36
27	Tile glaze	$м^2$	840,2
28	Tiles: basalt, mosaic	$м^2$	135,74
29	Washings	pieces	48
30	Washbasins	pieces	48
31	Toilets	pieces	32
32	Doors	pieces	248
33	Windows	pieces	131
34	Radiators	pieces	112
35	Pipes d=25	r.m.	255,2
36	Pipes d=100	r.m.	232,5
37	Cookers	pieces	24

4.5.1 The need for machines.

One of the main directions of technical progress in construction is a complex mechanization of production processes.

Complex mechanization - the method of fully mechanized is carried out of certain technological processes in construction.

It can be carried out by one or more machines. With a large number of operations used set of machines significantly increases productivity. The requirement of optimality and other parameters. Manual labor can be maintained only on operations, mechanization of which does not cause a significant increase in labor productivity throughout the complex of works and for which there is no economically acceptable technical solution: the development of mechanization creates a prerequisite for the elimination of works performed manually, especially heavy manual labor, as the main. So on auxiliary work with the replacement of its easier and more productive work on the management and maintenance of machines.

The number of mechanisms is taken so that the total duration of repair and construction works does not exceed the standard.

For the selection of machines and mechanisms using regulatory guides builders. Construction production Volume 3. "Organization of labor and mechanization of works" Moscow, 1989

1	Tower crane	1	МСК-5-20
2	Reference point of two devices	2	СТЭ-24
3	Transformer	1	
4	Concrete buckets	4	
5	Slings type " Spider»	2	
6	Crowbar installation	5	
7	Drill	2	
8	Shovel	6	
9	Hammer	6	

10	Hacksaw	6	
11	Electric saw	1	
12	Building level	8	
13	Electroscope	2	
14	Rule	4	
15	Poluterok	10	
16	Grater	10	
17	Cuts'	10	
18	Brushes ceiling brushes	10	
19	Spatulas	10	
20	Brush the handbrake	10	
21	Glass cutter	4	
22	Tile cutter	8	
23	Rake with a plumb	4	
24	Cradle, self-lifting	1	
25	Mobile compressor stations	1	
26	Machine parquet-grinding	1	
27	Vibrator	2	

4.5.2 The need for workers.

Construction processes can be carried out by workers, combined into labor teams – teams and units, as well as individual workers. Team-a group of workers who perform jointly assigned to them construction and installation work. Teams depending on a set of works and accordingly structure of performers can be specialized, i.e. consisting of workers generally of one specialty (assemblers, plasters, fitters, plumbers, etc.) or complex which include workers of several hasty specialties necessary for performance of complex processes.

The number of workers per shift and the composition of the team is determined in accordance with the complexity and duration of work. When calculating the composition of the brigade proceed from the fact that the transition from one capture to another should not cause changes in the numerical and qualification composition of the brigade. With this in mind, establish the most rational structure of combining professions in the team.

Experience of finishing organizations shows that the correct recruitment teams contributes to productivity growth by 2-5%. With acquisition teams should consider the professional qualification and the membership of workers, which must correspond to the adopted technological process and the amount of work performed, as well as the nature and conditions of work.

Table 4.6

1	Electricians (2)	4 rank	1
2	Plumbers (8)	4 rank 3 rank	4 1
3	Roofers (8)	4 rank 4 rank	4 4
4	The facing workers-carpenters (8)	4 rank	4

		2 rank	4
5	Bricklayers (20)	4 rank 3 rank	4 4
6	Diggers (6)	3 rank 2 rank	3 3
7	Carpenters (20)	5 rank 4 rank	3 5
8	Concrete batchers (10)	2 rank 3 rank	5 5
9	Installers (8)	4 rank 3 rank	3 3
10	Glaziers (4)	4 rank 3 rank 2 rank	4 2 2
11	Molars (10)	5 rank 4 rank 2 rank	2 2 2
12	Plasters (10)	3 rank 2 rank	4 4

4.6 The construction site preparation (Master plan)

Site preparation is a required step. Previous preparatory works are performed to create favorable conditions for the construction work to start.

The construction site preparation includes:

- The temporary roads construction and access roads to the construction site
- Temporary services laying
- Areas for construction machinery parking
- The construction site fence
- Temporary premises preparation

The construction site is shielded with solid protective guard fence according to GOST 23407-78. The temporary fence sections are accomplished with profiled sheet using polymer blue coating. The height of the section is 2.0 m, length is 2.7 m. Swinging gates are accomplished with profiled blue sheet. The height is 2.6 m, the width is 6.0 m.

Temporary fencing of the construction site is performed after receiving the permissible documentation in the following sequence:

1. mark the installation of the fencing location
2. deliver fence elements to the installation place
3. install a wooden rack
4. install metal corrugated sheets
5. install gates

The entrance to the construction site is an important step in the preparatory works beginning on the construction site. Proper placement of the roads leading to the construction site saves time for construction and supply of equipment and construction materials. Building roads should have traffic circles, on dead-end hallways reversal sites are arranged. In the considered object temporary concrete slabs are installed on the access and temporary roads. The size of the slab is 3000x1750x180 mm.

4.6.1 The calculation of the warehouses.

Warehouses under the conditions of storage of materials are: opening-for storage of materials requiring protection from atmospheric influences.

Closing for materials or exposed to costly damage in the open air.

Semi-covered (awnings) - for materials that do not change their properties from changes in temperature and humidity.

Storage capacity depends on the quantity and storage conditions of materials. The volume of stored materials is determined by the naming of their average daily consumption and stock standards.

The warehouse area is determined by the formula:

$$S=\frac{P}{N}$$

R - the amount of material stored in the warehouse;

N – norm of paving material on 1 m^2 of the warehouse.

The amount of material P is determined by the formula:

$$P=\frac{Q\cdot a\cdot n\cdot k}{T}$$

Q-the amount of material required for the production of this type of work;

a – the coefficient of uneven consumption of materials;

n – the rate of the stock of materials in the drive;

k - coefficient of non-uniformity of material receipt;

T - the duration of the settlement-the period of this type of work.

The calculation of the warehouse indicated in the following table: **Table 4.6**

№	Material name	Consumption longity in days	Notecrease coefficient		Material need		Material reserve days		Calculated material reserve P=(a·n·k·Q)/T	Warehouse area		Warehouse type
			Хисоб даври учун умум (2)	Суткалик (Q/T)	Келиб атушиши ()	Эхтиёж (к)	Маъёр (n)	Хисобдаги (n.a.k)		Гм² га (N) сақлаш м.	Хисобдан S=P/N	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Metal rods	3	6830	2276,6	1,1	1,2	5	6,6	15025,5	1	15025,5	opened
2	Concrete	5	177,68	35,5	1,1	1,2	1	1,32	46,82	2	23,43	opened
3	Staircse steps	1	12,96	12,96	1,1	1,2	5	6,6	85,53	0,5	171,07	opened
4	Staircase hall	1	7,6	7,6	1,1	1,2	5	6,6	50,16	0,5	100,32	opened
5	Slabs	24	114,86	4,78	1,1	1,2	5	6,6	31,54	0,5	63,08	opened
6	Brick	10	114560	11456	1,1	1,2	5	6,6	75609,6	0,5	151219,2	opened
7	Cement mortar	10	65,87	6,587	1,1	1,2	1	1,32	8,69	0,2	8,45	opened
8	glazing	2	321,3	160,65	1,1	1,2	5	6,6	1060,29	48	22,8	Closed or shade
9	Ruberoid	1	5,509	5,509	1,1	1,2	5	6,6	36,35	100	0,36	opened

10	Ceramzit	6	6,97	1,16	1,1	1,2	5	6,6	7,656	2	3,828	opened
11	Sand	6	6,97	1,16	1,1	1,2	5	6,6	7,656	2	3,828	opened
12	Board III c (25-32 мм)	5	2,556	0,51	1,1	1,2	5	6,6	3,366	1,8	1,87	closed
13	Ledger for parquet	5	18,18	3,63	1,1	1,2	5	6,6	23,95	1,8	13,31	closed
14	Metlohov slab	3	135,74	45,24	1,1	1,2	5	6,6	298,58	15	19,9	closed
15	Folding parquet	13	1448,6	111,43	1,1	1,2	5	6,6	735,43	15	49,02	closed
16	Glue	13	0,7	0,053	1,1	1,2	5	6,6	0,35	20	0,017	closed
17	Bitumen mastique	3	1,64	0,54	1,1	1,2	5	6,6	3,56	100	0,035	opened
18	Bitumen sketch plaster	3	0,507	0,169	1,1	1,2	5	6,6	1,115	100	0,011	opened
19	Socle tile	3	102,5	34,16	1,1	1,2	5	6,6	225,49	15	15,03	closed
20	Lime chalk	16	1254,2	78,38	1,1	1,2	5	6,6	517,3	20	25,86	closed
21	Artificial tiles	5	62	12,4	1,1	1,2	5	6,6	81,84	10	8,184	opened

22	Bath tubs	3	24	8	1,1	1,2	5	6,6	52,8	1,5	35,2	closed
23	Wash basin	2	24	12	1,1	1,2	5	6,6	79,8	6	13,2	closed
24	Washing sincs	2	24	12	1,1	1,2	5	6,6	79,8	6	13,2	closed
25	Toilet sinc	2	24	12	1,1	1,2	5	6,6	79,8	4	19,95	closed
26	Radiators	5	137	27,4	1,1	1,2	5	6,6	180,8	10	18.08	closed
27	Doors	5	199	39,8	1,1	1,2	5	6,6	262,08	10	21,89	closed
28	Windows	6	136	22,66	1,1	1,2	5	6,6	149,35	7	21,89	closed
29	Pipes Ø 25	3	255,2	85,06	1,1	1,2	5	6,6	561,39	10	56,13	closed
30	Pipes Ø 100	5	232,5	46,56	1,1	1,2	5	6,6	307,29	2,5	122,91	closed
31	syrup mixture	16	165,35	8,58	1,1	1,2	5	6,6	43,42	20	2,17	closed
32	Dry paint	16	85,28	5,33	1,1	1,2	5	6,6	35,17	20	1,75	closed
33	Copper syrup	16	30,10	1,88	1,1	1,2	5	6,6	12,41	20	0,68	closed

34	Farm soap	16	30,10	1,88	1,1	1,2	5	6,6	12,41	20	0,68	closed
35	Oil varnish	5	29,54	59,08	1,1	1,2	5	6,6	389,92	20	19,49	closed
36	Lime mixture	11	27,44	2,49	1,1	1,2	1	1,32	3,28	0,2	16,43	closed
37	PVC paint	6	856,56	142,76	1,1	1,2	5	6,6	942,21	20	47,11	closed
38	PVC mixture	6	174,22	29,03	1,1	1,2	5	6,6	191,59	20	9,57	closed
39	PVC draft plaster	6	217,77	36,29	1,1	1,2	5	6,6	239,51	20	11,97	closed
40	Cookers	2	24	12	1,1	1,2	3	4,3	51,6	0,6	86	closed

As a result, we accept 60x10 m open stores, 2 closed 6x10 m warehouses.

4.6.2. Calculation of temporary buildings and structures.

Temporary buildings are called above-ground auxiliary and service facilities necessary to ensure the production of construction and installation works. Temporary buildings are constructed only for the period of construction. The number of temporary buildings and their location on the construction site are determined by the nature and size of the object under construction, the number of workers and engineering personnel. Temporary buildings can be administrative and sanitary. Administrative offices include the head of the site, the foreman dispatching and

passing. Sanitary appliances – walk-in closets; drying rooms for clothes, showers, canteens, health centers, etc.

The calculation of the required area is carried out by the maximum number of workers in the calculation period (shift). Fire breaks are arranged between temporary buildings in accordance with the requirements of fire safety.

Areas of household premises are accepted according to the calculated norms. Calculation of household premises are in the form of a table.

Table 4.5

№	Rooms' name	Number of employees	Norm area м^2	Calculated area, м^2	Accepted area м^2	Building type
1	Wardrobe	42	0,5	25,5	25	5*5
2	shower	42	0,82	41,82	45	9*5
3	Drying room	42	0,2	10,2	12	4*3
4	Dining room	42	0,25	12,75	15	3*5
			0,75	38,25	40	4*10
5	Lounge	42	0,065	3,315	4	4*1
6	Wash room	42	0,1	5,1	6	3*2
7	Warm rest room	42	7	28	28	4*7
8	Dispatch control room	4	4	16	16	4*4
9	office	4				
10	Toilet	42	0,1	2,8	3	Flat box
11	Guarding service	2	2	2	4	Flat box

4.6.3. Calculation of temporary water supply networks.

Temporary water supply and Sewerage in the construction is designed to provide industrial, household and fire needs.

When designing a temporary water supply, it is necessary to determine the need, select the source, outline the scheme, calculate the diameters of the pipelines, tie the route and the construction on the construction plan.

The calculation of water demand for temporary water supply is determined by the formula

$$Q_{gen} = Q_{pr} + Q_{ec} + Q_{fire}$$

Where gen. – the total estimated water consumption,,

Q_{pr} – water consumption for production needs.

Q_{ec} – water consumption for household needs.

Q_{fire} – water consumption for fire-fighting needs

$$Q_{pr} = \frac{1{,}2\ \Sigma Q_{cp} \kappa_1}{8x3600}$$

Where Q_{cp} – the average production water consumption per shift.

K_1 – coefficient of non-uniformity of water consumption (K_1 = 1.6).

8 – number of hours per shift

1000 PCs. - 220L

114560 pieces - x =>x=25201,2 l $\Sigma Q_{cp} = Q^{к} = 25201{,}2$ l

$$Q_{cp} = \frac{1{,}2x25201{,}2x1{,}6}{8x3600} = 1{,}6 \text{ l/s}$$

$$Q_{хоз} = \frac{вN_1 * K_2}{n * 3600} + \frac{cN_2}{m * 60}$$

Where b – consumption rate per 1 worker per shift

N_1 – the number of employees at max shift people;

K_2-coefficient of hourly unevenness of water demand equal to-1.5-2.5;

n – number of hours per shift;

C-rate of water consumption per person taking a shower (30 l);

N_2 - number (hours) of workers taking a shower in 1 shift;

m – while working shower installations in mines;

b =25л; N_1= N_2=56 ppl; K_2=2,0; n=8; m=45.

$$Q_{eco} = \frac{25*56*2,0}{8*3600} + \frac{30*28}{45*60} = 0,048 + 0,3111 = 0,35 \text{ l/s}$$

The minimum water consumption for fire-fighting purposes is determined at the rate of the simultaneous action of two jets of hydrants of 5 l/s for each trickle.

$$Q_{fire}=5 \cdot 2=10 \text{ l/s}$$

This consumption is accepted for objects with a building area of up to 10.

$$Q_{gen} =1,6+0,35+10=11,95 \text{ L/s.}$$

Calculation of water pipes is to determine the diameter of the pipes by the formula:

$$d=\sqrt{\frac{4Q_{gen}*1000}{\pi*V}}$$

V – velocity of water movement

$$d=\sqrt{\frac{4*11,95*1000}{3,14*1,5}} =100,1 \text{ мм}$$

We accept diameter of an external fire-prevention water supply system = 100 mm.

4.6.4. Calculation of temporary power supply networks.

With the increasing level of industrialization and mechanization of works in construction, the role of electricity supply is increasing – one of the decisive factors that ensures the normal course of construction works.

Design of temporary power supply is one of the main tasks in the organization of the construction site. General requirements for the design of power supply of the construction site-providing electricity in the required quantity and quality (voltage, frequency of tone) flexibility of the electrical circuit - the ability to supply consumers in all areas of construction, reliability, power supply, mechanization of the cost of time devices and minimum leakage in the network.

Calculation of electrical loads was made according to the formula:

$$P_v=1,1\frac{\sum K_k P_c}{\cos\delta}+\frac{\sum K_{rc} P_T}{\cos\delta}+\sum R_{3c} P_{0v}+\sum P_{OH}$$

K_k, K_{rc}, K_{3c} – demand ratio;

Pc – the power of consumer, KW;

Pov – мощность устройства внутреннего освещения;

$P_т$ – power of internal lighting device;

$P_{он}$ – power for outdoor lighting;

cos δ – power factor, depends on the number and load of power consumers;

The number of spotlights for lighting is determined by the formula:

$$n=\frac{P_x E_x B}{P_n}$$

P – specific power (0,2 Wt/м^2);

Σ – illumination (10 l K);

Pn – projector power (1500 Wt);

B – field size;

$$n=\frac{0,2\cdot 10\cdot 3847,17}{1500}=5 pieces$$

Number of projectors - 5 units;

P_{c1} = 45 кWt; $К_{п}$ = 0,2; cosδ = 0,5 – tower crane;

P_{c2} = 4,5 кWt; $К_{гс}$ = 0,35; cosδ = 0,4 – welding apparatus;

$P_{т}$ = 4,5 кWt; $К_{гс}$ = 0,5; cosδ = 0,65

$P_{ов}$ = 0,8 – interior lighting;

$P_{он}$ = 5·1,5=7,5

$$P = 1{,}1\left[\frac{45\cdot 0{,}2}{0{,}5} + 2\left(\frac{4{,}5\cdot 0{,}35}{0{,}4} + \frac{4{,}5\cdot 0{,}5}{0{,}65} + 0{,}8\cdot 1{,}845 + 7{,}5\right)\right] = 1{,}1\left[18 + 7{,}875 + 3{,}462 + 1{,}476 + 7{,}5\right] = 42{,}144\kappa Wt$$

For this platform, we accept the Transformer SKTP 100-5110 10.4 to 50 kW in the closed construction of 3.05 m in length and 1.55 m in width. The 3801220 and 22001127 voltage-dependent substations are connected to the consumer transformer substation via network jacks.

4.6.5. Technical Economic Indicators.

Work on all volume:

Normal - 8,23 people / day

received - 7.407 person / day.

100 m2 outdoor work:

Normally - 2,528 people / day

received - 2.275 person / day

What a worker doing in a shift:

Normative - 39,556 m2

Acceptance - 43-956 m2

CHAPTER V.
LABOR SAFETY PART

5. LABOR PROTECTION IN CONSTRUCTION.

5.1. THE PURPOSE OF SAFETY.

Security section is a set of organizational and technical actions and the means preventing influence on working dangerous factors. Any human activity is always associated with the presence of risk or danger to his health. "Labor protection" at work and in the educational process " as an independent academic discipline includes issues of labor protection, legal and regulatory framework, sanitary and hygienic characteristics of working conditions, safety of technological processes, including organization, labor protection at school.

It is important to note that occupational safety is considered as a safety of life in the conditions of production, as an element of human activity.

The goal is to form the necessary knowledge, skills and skills of safe work in the workplace and in everyday life, prevention of injuries and ensuring favorable conditions of activity.

The main objectives of the discipline:

- forming of the necessary theoretical basis in the field of labor protection;

- to reveal the interaction of labor protection with the main disciplines: ergonomics, hygiene, labor psychology, ecology, organization of production;

- mastering the legal and regulatory framework of labor protection;

- forming of knowledge about occupational disease and poisoning;

On economic issues of labor protection;

- occupational health and industrial hygiene.

5.2. HYGIENE MEASURES IN CONSTRUCTION.

Sanitary and hygienic measures based on the study of the impact of working conditions on the body and human health and thus closely related to the scientific organization of labor, provide for the implementation of sanitary and hygienic services for workers in the workplace and in the household premises. Such measures include the creation of normal air, lighting, elimination of harmful effects of vibration and noise, the equipment of necessary household and sanitary facilities, etc.

The object-6-storied residential building Makhtumkuli street, Yashnabad district, city Tashkent.

The purpose- is to build new residential apartment building aforementioned address. To create a safe environment for them, the following hygienic requirements are required:

- Prior to the construction of the facility, the preparatory work for the organization of the construction site should be carried out, provided for by the project of organization of construction and the project of production of works (PPW).

- The territory of the construction site should be protected.

- The construction site before the construction of the facility should be released from old building debris, planned with the organization of water disposal.

- Temporary roads, electricity, lighting, water supply and Sewerage networks need to be arranged at the construction site.

-On the territory of the construction site or outside should be equipped with sanitary, industrial and administrative buildings and structures.

- Crane ways need to be installed on the construction site, places of storage of materials and structures, and places for receiving mortar and concrete should be determined.

- The organization and carrying out of works in construction production are carried out based on the constructive project drawings and projects of works developed taking into account requirements of the current regulatory documentation, and these sanitary rules.

- When performing construction work in conditions of hazardous or harmful production factors, sanitary and industrial premises are to locate outside the hazardous areas.

Hygienic requirements for building materials and structures:

- The types of construction materials used (sand, gravel, cement, concrete, paint and varnish materials, etc.) and construction structures should have a sanitary-epidemiological conclusion.

-It is not allowed to use polymeric materials and products with toxic properties without a positive sanitary-epidemiological conclusion, issued in the prescribed manner.

- Paint, insulation, finishing and other materials that emit harmful substances may be stored in the workplace in quantities not exceeding the replacement needs.

- Materials containing harmful substances are stored in hermetically sealed containers.

- Powdered and other loose materials should be transported in tightly closed containers.

- Construction materials and structures must be delivered to the construction sites in a ready-to-use form. When preparing them for work in the conditions of the construction site (preparation of mixtures and solutions, cutting of materials and structures, etc.), it is necessary to provide premises equipped with mechanization means, special equipment and local exhaust ventilation systems.

5.3. LABOR SAFETY IN CONSTRUCTION.

It is also necessary to ensure the high quality of the materials, products, structures, construction machinery and mechanisms used, to ensure effective sound or light alarm, and used in the construction of inventory devices and mounting equipment must meet all the requirements of labor protection and safety.

In accordance with the current rules and regulations, the management of the construction company should organize instruction, study and testing of knowledge of workers and engineers in the field of labor protection and safety with mandatory documentation. These activities are to carry out in accordance with the "Standard programs of training on labor protection and testing of knowledge of the requirements of labor protection of employees of organizations."

Newly entering the construction workers can be allowed to work independently only after passing their introductory (General) safety instruction, safety instruction directly at the workplace (primary instruction) and internship. In addition, they must be trained in safe working methods according to the approved program no later than 1 month from the date of employment. Instruction on health and safety should be carried out when switching to a new job, when changing the working conditions and during breaks in work. Further training on labor protection and knowledge check of workers of rules on labor protection shall be made annually.

To work on particularly dangerous and harmful industries, which also include climbing work, installation of structures at height, refractory, acid-resistant and insulation work, processes using radioactive substances, etc., workers are allowed only after appropriate training and passing the exam. Working in dangerous and (or) harmful conditions, it is necessary to issue certified personal protective equipment, preventing the possibility of accidents, and clothing that protects the body from the influence of harmful environmental factors. Workers should be instructed on the rules of use of the means of protection issued to them.

A lot of work on labor protection at construction sites is carried out by labor protection commissioners (public inspectors), who are elected from among the most qualified workers. The labor protection Commissioner monitors the implementation of labor legislation on working time, rest, work of women and youth, as well as rules, norms and instructions on labor protection directly at the workplace. The public health inspector keeps a journal in which he writes down his comments and suggestions. The journal is stored at the site of the work Manager. Work managers are required to promptly eliminate the violation of labor protection norms and rules noted in the journal.

Builders carry out control, as a rule, according to a three-stage scheme. At the first level of control involves the Brigadier, the master and the public inspector for labor protection brigade. They daily before the shift check on the site security of safe conducting construction and installation works and observance of sanitary and hygienic service of workers.

5.4. FIRE SAFETY

Fire safety includes a set of measures to prevent fires, improve the fire condition of buildings and structures, reduce fire risk in production processes.

Fire safety-is one of the basic rules that must be followed without fail, both directly in the construction of the construction site, and its further operation. You can also add that the basis of fire safety operation of the construction site are laid at the stage of design and construction of the facility. In the process of construction works on the object: Construction of 7-storied residential building for unmanned areas in the Yashnabad district of Tashkent region, as a rule, provided:

- Execution of measures aimed at compliance with fire safety, which is provided for in the construction project; construction project, in turn, is developed in full compliance with the approved rules and regulations.

- Mandatory presence at the construction site: fully operational, tested and operating fire-fighting equipment. Availability of fire-fighting equipment should be provided at all stages of construction work.

- Providing opportunities for evacuation of personnel of the construction organization and all who are in the area of construction works in case of fire danger.

- Ensuring the protection of material and other values that may be on the construction site.

Ensuring fire safety at the construction site, both in the conditions of construction works and in the operating conditions, help to effectively perform specialized fire protection facilities. Such structures, of course, include fire ladders. These elements of fire protection are made of non-combustible materials, usually of metal and are installed in places of evacuation of people defined by the construction plan. The number and design features of fire ladders are determined based on the purpose of the construction, area and location. In addition to fire ladders in buildings and structures, the rules provide for the installation of such elements as fire hatches. With the help of fire hatches provides rapid evacuation of people from hard-to-reach areas of buildings and structures.

Fire-fighting steel doors and fire-resistant fire partitions also play a significant role in the organization of the fire system. Due to the presence of such elements, it is often possible to block the path of fire and prevent the spread of fire throughout the area of the building. Production of steel doors reliably protecting people in case of fire. Such doors are able to withstand significant temperatures and at the same time maintain its integrity. The use of fire doors is provided in a variety of cases, ranging from installation in the structure of residential facilities to special production and service premises.

CONCLUSION

CONCLUSION

This graduation work is designed to offer a project proposal to the current Center for Modern Makhallyas Affiliated with 16 House, Yashnabad District, Tashkent, under the program of modernization and building new affordable houses in cities on the basis of personal initiatives of the President of the Republic Of Uzbekistan. we did. The complex is equipped with all the latest modern amenities: , dining rooms, shops, a fashionable parlor, hairdressers' room, a room for , a kitchen-café, an office, a conference room, a home technique repaire shop, a laundry service and auxiliary rooms. It is intended for 6-floor apparments.

Building a design solution based on the seismic characteristics of the area. The design of the building is designed to meet the requirements of consistency, rigid, precision and seismic resistance, as well as meet the requirements for heat transfer, sound conductivity and moisture protection.

The monolithic reinforced concrete structure is used as a load carrier. They are filled with cley bricks. Special armature kits have been used. Iron reinforced concrete pallets were used as roofing and roofing materials. Modern finishing materials is used as make-up work. The building is equipped with all modern types of engineering equipment.

Besides, landscaping and landscaping of the surrounding area are carried out.

As a result, the complex building is robust, seismic resistant, and the overall appearance of the building is decorated and landscaped in cutting edge design.

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ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ҚУРИЛИШ ВАЗИРЛИГИ

ТОШКЕНТ АРХИТЕКТУРА ҚУРИЛИШ ИНСТИТУТИ

ДИПЛОМ ЛОЙИҲА (ИШИ) РАҲБАРИНИНГ ШАХСИЙ ХУЛОСАСИ

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(Ф.И.Ш.)

2. Диплом лойиҳа (иши) мавзуси «Project suggestion of 6-storied apartment building in street Makhtumkuli Yashnabad, Tashkent city»

3. Диплом лойиха (иши) ҳажми 4 лист
Тушунтириш хати 76 бет

4. Умумтехник ва махсус тайёргарлик тавсифи

5. Бажарилган диплом лойиҳаси (иши)нинг кисқача таърифи: *Архитектура-қурилиш қисми: объект тавсифи, мақсад ва кайта тиклаш вазифалари, ситуация режаси, тиклашгача ва ундан кейинги фасадлар (бинонинг олд томонлари). ТИК ҳисоблаш-конструкция қисми: батафсил текширувлар, бинонинг эксплуатацияга яроқлиги бўйича баҳолаш: пойдеворлар, ораёпма ҳисоби. Ташкилий техник қисм: қурилишнинг бош режаси, тармоқ жадвали, бир иш турининг техник харитаси, ишчилар ҳаракати жадвали; ТИК.*

6. Диплом лойиҳа (иш)нинг сифати
Битирув малакавий ишининг сифати аҳло

7. Бакалавр диплом лойиҳаси (иши)нинг ижобий томонлари (янгилик, оригиналлик) Битирув малакавий ишининг ижобий томони унинг инглиз тилида ёзилганлиги

8. Диплом лойиха (иш)нинг камчиликлари
камчиликлар йўқ

9. Хулоса Талаба Юлдашев Ж. нинг битирув малакавий иши талаб даражасида бажарилган ва „аъло" баҳога баҳоланади

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Сана 26.06.2018.

O'ZBEKISTON RESPUBLIKASI QURILISH VAZIRLIGI
TOSHKENT ARXITEKTURA-QURILISH INSTITUTI
DEVONXONA

Тюлинова

THE MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION OF THE REPUBLIC OF UZBEKISTAN

R E V I E W

For the graduation diploma thesis of the student of department Construction Management, Tashkent Architectural & Civil Engineering Institute

1. Yuldashev Jahongir Ibrohimjon ogli, study field 5340300 Urban Construction and economy specialization
2. By the topic of the diploma work: Project proposal of six storied residential building in Makhtumkuli street, Yashnabad district, Tashkent city

3. Graduation work includes more than sixty pages of explanatory note, and attachments of ketches in *AI* format.

4. Assessment by general technical knowledge: *technically proficient*

5. A short plot of the work: *Architectural planning part: object description, designing purpose and actuality of the work, situational plan, facades by different axis (front side of the building). technical economic indexes, Constructive-calculation part:: foundation and column's calculation, roof closing slabs plan, Technically organizational part: Master plan of the construction, network graphics table, a specific job's technological map, workers' operative chart; Technic economic indexes.*

The graduator chose actual work, which is currently, is very important. With the initiative of our president Sh. Mirziyoiev, accepted the movement strategy program included in the introduction of this thesis, directly relevant of actuality of this graduation project. Because it is mentioned in the program that providing our nation with affordable houses in residing places. The graduator has proficient technical knowledge, which is vivid from the chapters and graphical part of this diploma work. Moreover, all content is error free, relevant to the topic with specific data. Personally checked every chapter of this work, and no ambiguity contexts are found. Special terms and terminologies are used in context efficiently, so that any reader can fully understand its comprehension. It occurs some grammar and punctual mistakes in this work yet they do not affect high to the meaning. Therefore, reader clearly understand what the author wants to deliver in context.

Overall, every chapters are professionally written, and can be published even in scientific publications. The graduator's English is good enough to write specific technical articles.

Reviewer: Qambarova M.M. Signature:_____ Date:

Job place: Tashkent architectural and civil engineering institute.

Position: Chief English teacher

TASDIQLAYMAN

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6. The relevance of the work with the task: *All graphical works and explanatory calculations notes are relevant to the above aforementioned task.*

7. Individual efficiency and organizational skill of the graduator: *The graduator have done highly efficient work with professional organizational skill, which is vivid from his all-graphic jobs. Illustration of the plans façades, sections and nodes are clear, organized very well. Only some measuring details remained unclear in tiny objects.*

8. The positive sides, achievements of the diploma work (innovation, originality)
This graduator tried to implement his original ideas to design up-to date residential building including a lot more comforts in its architectural planning. All facilities are deeply considered so that the author intended to create very comfortable environment for the building users. Moreover, landscaping and greenery jobs are professionally organized in master plan.
9. The diploma thesis drawbacks: *Some architectural elements are missed in façade and sectional illustrations. Moreover, the graduator could have shown much more perspective design of the building and surrounding objects. Some grammar mistakes are visible in his explanatory note; however, it is not highly affect to comprehend the meaning of the sentences. Some constructive calculations would be better to show the objects partition elements.*

10. Conclusion and recommended points: *Overall, the job is nicely done with all required elements. As a young specialist, graduator could achieve more and mastered his jobs to the best. As a professional Chief Architect I would give very good comment and excellent point for this diploma work.*

Reviewer: _____ Muhammedjanov B.K.

Job place: Unique Arh Project private company, Tashkent.

Position: Chief Architect

UNIQUE ARH PROJECT

Date: _____